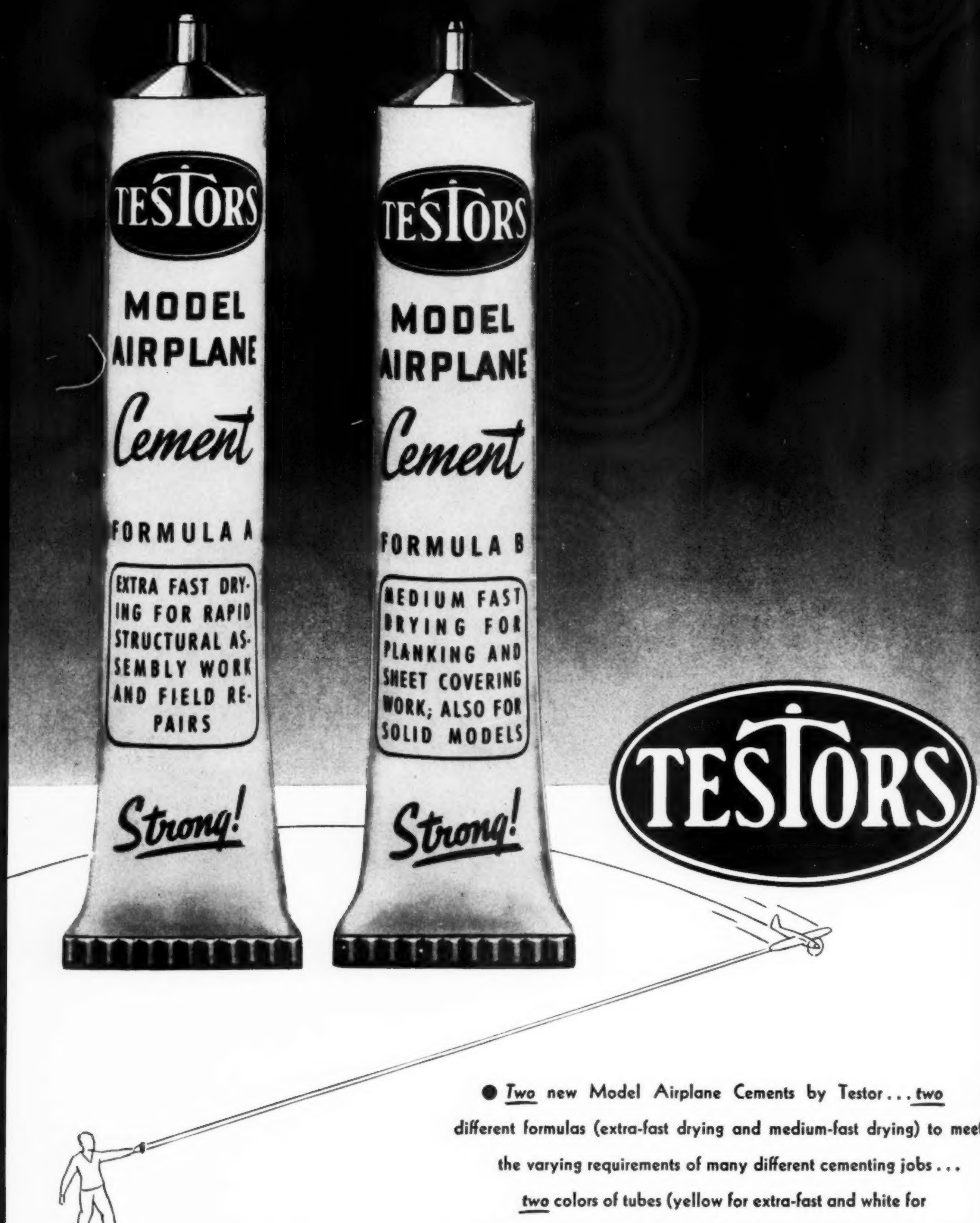
'47 NATIONALS OPEN STUNT WINNER . . Page 9

MODEL AIRPLANE NEWS

MARCH 1948 • 25 CENTS



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A new, large gymnasium has just been completed on the Parks campus. Ex-Notre Dame star Bob Walsh, Parks Coach (center), is shown here with the Parks basketball team.

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MODEL AIRPLANE NEWS
JAY P. CLEVELAND
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Serving Aviation 19 Years

MARCH 1948 VOL. XXXVIII No. 3

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THE REPORTED supersonic flights of the *Bell* XS-1 rocket-powered research airplane should make Dec. 1947 rank in importance with that Dec. day in 1903 when man first flew, for the first flight of man at speeds faster than that of sound opens an entirely new era in flight second only in importance with those original historic flights at Kitty Hawk, N.C. Air Force's Capt. Charles Yaeger and NACA test pilots Howard Lilly and Herbert Hoover are said to have exceeded Mach No. 1.0 (speed of sound under the conditions of the flights) on several occasions at Muroc Air Base, Calif. Most important feature of the flights, according to the reports, is that no "undue difficulties" were experienced as the deadly transonic region was traversed, putting at rest the widely feared dangers of these speeds. Another significant factor in this penetration of the supersonic realm by piloted aircraft is the fact that a simple straight-wing airplane was used, which indicates the possibility that the troublesome swept-wing design may not be needed after all.

GRUMMAN HAS ZOOMED back into its long held leadership in carrier fighter design, this time in the new field of jet propulsion with its startling new XF9F-2 *Panther*. After a year's silence, during which all eyes were on Grumman's reputation as the premier carrier fighter creator, Leroy Grumman and his topflight engineering staff have produced a radical new design that may well provide the final answer to the problem of the jet carrier fighter: short takeoff. While the conventional jet fighter requires 4-5,000 ft. of run to get off the ground, the *Panther* gets into the air smartly in 800 ft. in still air and as little as 450 ft. in a 30-knot wind, normal operating conditions with a carrier pointed into the wind at sea. The new craft will be powered alternately by Rolls-Royce *Nene* engines produced by Pratt & Whitney and by J-33-8 engines produced by Allison. Both engines are in the 5,000 lb. thrust class, with close to 6,000 lbs. when using water injection. Top speed of the barracuda-tailed *Panther* is close to 650 mph with a rate-of-climb of 9,000 ft. per. min. Landing speed is only 85 mph, however, due to "droop snoot" wing leading edge assemblies. This nose flap arrangement drops the leading edge down and forward simultaneously with the drop downward and rearward of the flaps at the trailing edge, resulting in an extremely high camber with resultant high lift and consequent low landing speed. Navy ordered 130 F9F's with additional quantities pending, promising the *Panther* and Grumman a still brilliant future in the Navy carrier fleet.

(*Turn to page 64*)

(Above) Grumman XJR2F-1 *Albatross*, designed for Navy sea-air rescue work, can carry 14 passengers at 225 mph, travel at 212 mph on one engine, and has top speed of 270. (Below) D-558-2 *Skyrocket*, Douglas' second sonic research ship, carries same jet engine as earlier *Skystreak*, plus a rocket powerplant

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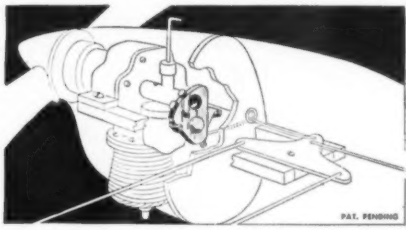

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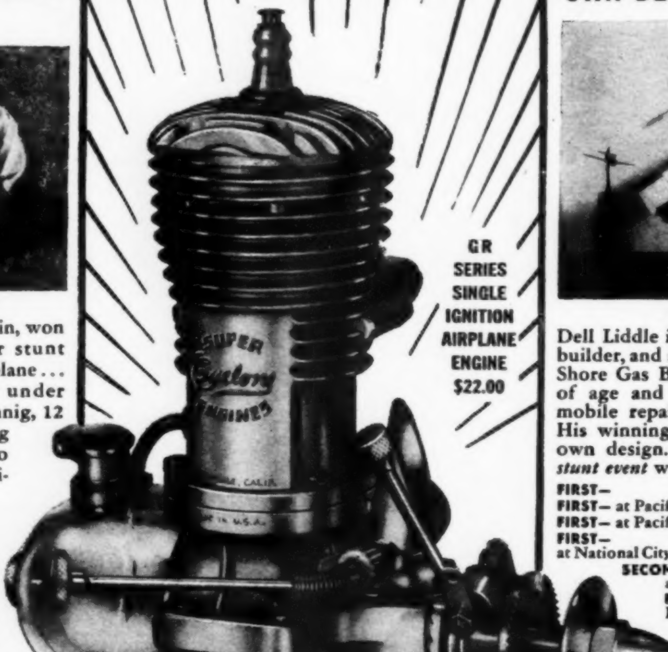
From Missouri

...MICKEY MUENNIG WINS STATE JUNIOR STUNT CHAMPIONSHIP WITH HIS SUPER-CYCLONE POWERED BI-PLANE—

MICKEY MUENNIG

Mickey Muennig, from Joplin, won the Missouri State Junior stunt championship with his bi-plane... the contest being held at under A. M. A. rules. Young Muennig, 12 years old, has been building model planes only 2 years. To quote, "He put on an exhibition which brought praise from the contest director and three judges who graded contestants in putting their models through loops, wing-overs, inverted flying, figure eights...and other various maneuvers. He won the title over all contestants between 8 years old and 21 years old."



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FIRST— at Santa Ana Air Base
FIRST— at Pacific Beach Winter Fair Jan. 1st
FIRST— at Pacific Beach Winter Fair Jan. 5th
FIRST— at National City Gas Hoppers Model Contest
SECOND— at Linda Vista Model Contest
FIRST— at North Shore Gas Bugs Annual U-control meet at Pacific Beach, California
FIRST— at San Diego Airliners Annual Meet at Lane Field
FIRST— at San Diego County State Fair, Del Mar

with numerous other 2nd and 3rd places

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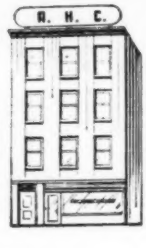

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Wilco Coil	1.95
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(FREE: See item 9 above)

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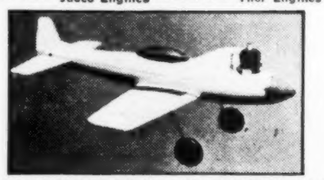

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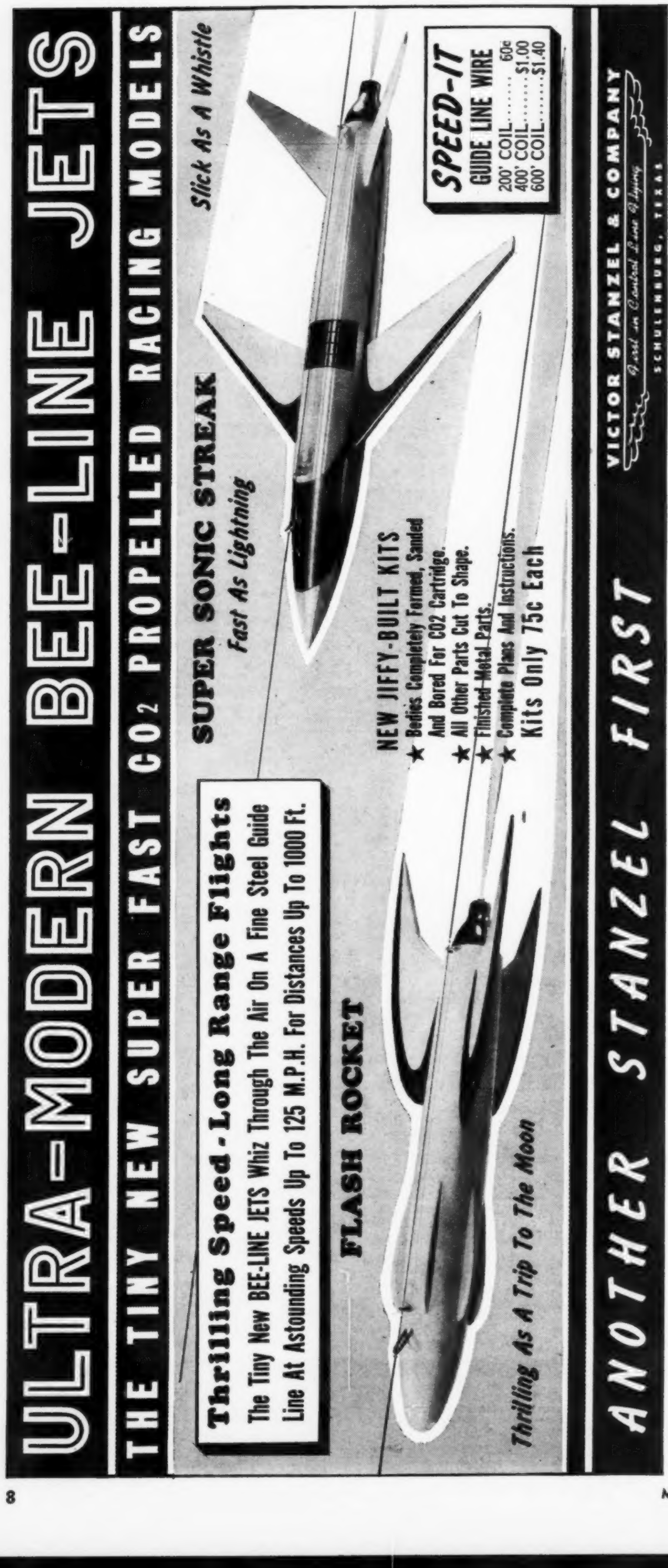


SCRAP BOX

BY BILL WINTER

WRITING this a few days after Christmas, we feel the urge to pour a little oil—not the old oil—on the troubled waters of our modeling relationship with the British builders. Few American hobbyists see the two British model airplane publications and, no doubt, fewer Britains are able to procure any of the American publications. But from previous comments in MODEL AIRPLANE NEWS, American builders must know that something is amiss. Who took the first poke at whom we don't care, but of late the ring has been jammed with battlers of both nationalities, swinging merrily away.

Some years ago the British magazine, *The Aeroplane* indulged in a fracas with our *Aero Digest*, each lambasting the tar out of the other country's airplanes. C. G. Grey, then editor of *The Aeroplane*, even went to the trouble of photographing an airplane made out of empty oil cans and referring to it, if we remember correctly, as a typical American design. C. G. must have been indulging his sense of humor. Unfortunately, there is no humor in the present acrid arguments. Even since the last Wakefield contest was won hands down by Dick Korda, and Mr. Houlberg—the "chaperon" of the British team—went home to comment in print that we didn't know how to build a Wakefield model, we have been puzzled.

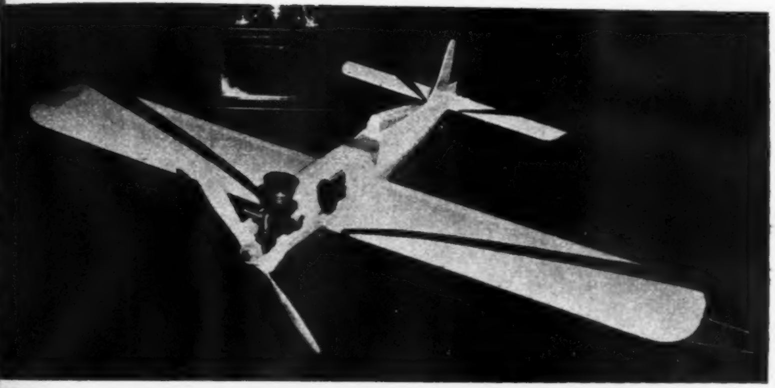
By British standards and conditions we possibly don't build a Wakefield design that would consistently win with British weather. Emphasis over there is on clean design and long power runs, and five minutes duration in dead air is nothing to rave about. Although the fine British models were swamped by our a.m. thermals and p.m. gales at the Wakefield held in Bendix, N.J., Houlberg apparently missed the point that our boxy looking jobs do very well indeed in such conditions. Thermal hunting, with powerful motors and good adjustments, are our forte. The British model press has been harsh on most things American, having bitterly opposed the pylon model and now the control-line model. But the British press and old-guard modelers don't reflect actual trends in that country. That is one reason why we so easily condemn British modeling as being archaic, when such is far from the truth.

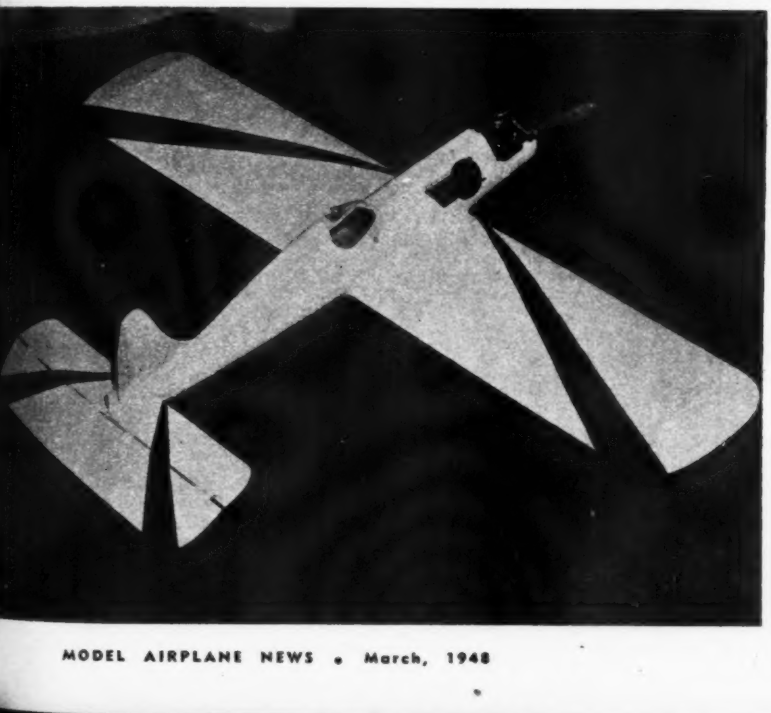
The West Essex Aeromodellers make that point in a recent communication, then go on to say: "U-control, especially stunting, shows signs of becoming popular over here. You may think us backward because the so-called gas 'experts' have not progressed beyond 1938. Hardly anyone besides these old-timers uses gawky undercarts, and few favor precision free flighters. It must not be forgotten that gas flying was entirely forbidden in the British Isles from May 1940 to late 1944, and gas flying was not really resumed until 1947 when engines, mostly Diesels, became available. Until 1947 there were hardly any gassies at all, let alone pylon jobs.

"Entries at our British Nationals in 1947 were small because most of the men between 18 and 25 were still in the forces—think what a hole that would have made at Minneapolis or Detroit! The location of

(*Turn to page 37*)

The '47 Nationals Open Stunt Winner used this ship—it can win for you, too





HOT ROCK

BY BOB TUCKER

THE original *Hot Rock*, which incidentally is still flying after many hours in the air, brought home two first and second places. Two later models won first in the Open Stunt event at the Nationals. The present ship makes a good consistent flyer and is very simple to construct.

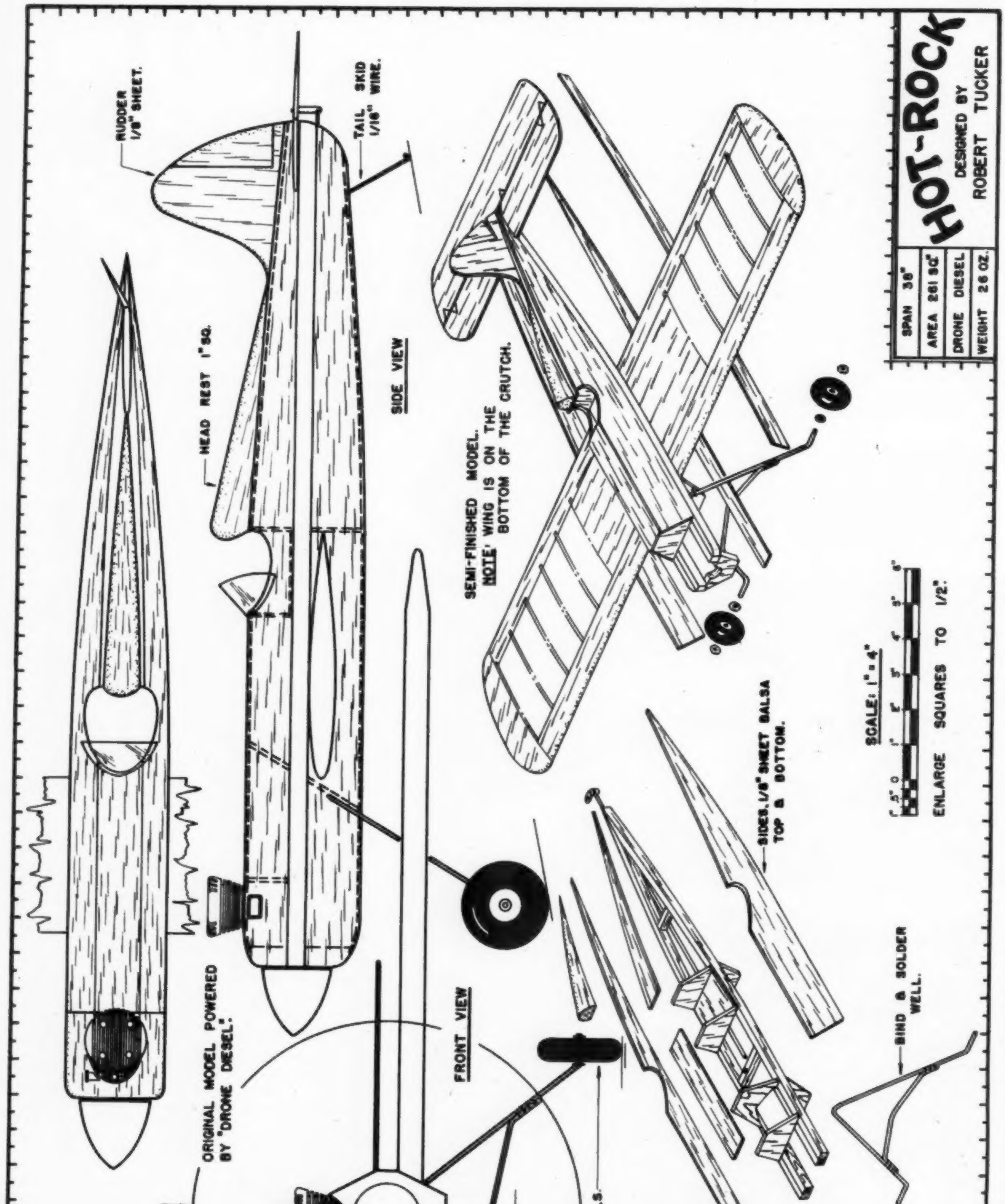
Before the *Hot Rock*, my greatest feat in stunt flying was a half hearted loop with a stock kit airplane. After a few flights with a *Dronette* I designed and built the first model. Luck was with me and No. 1 came out to be just what I wanted. Then came learning the maneuvers and doing them over and over until I was satisfied. The first contest for the ship was the *1947 Philadelphia Flying Circus* where I came in two points behind first place. Throughout the summer the ship placed in every meet I entered. Then came my first Nationals. The ships (four of them) did everything that I could make them do, and flew consistently enough for me to fly two at once without motor control. The result was first place in the Open event.

WING—The wing is put together free flight style: 1/4 sq. leading edge, 1/8 x 1/4 spars, 1/4 x 1" tapered trailing edge. The leading edge is sheeted with 1/16 sheet after the bellcrank installation is made. The bellcrank is fastened to the center rib and lead-out wires are run through holes in the ribs and tubing through the tips. The centersection is sheeted three ribs each side of center. The tips are sheeted with 1/16 sheet, grain running lengthwise. Covering is Silkspan. The push rod is fastened to the bellcrank before the bottom center section is sheeted and run through a hole in the sheeting.

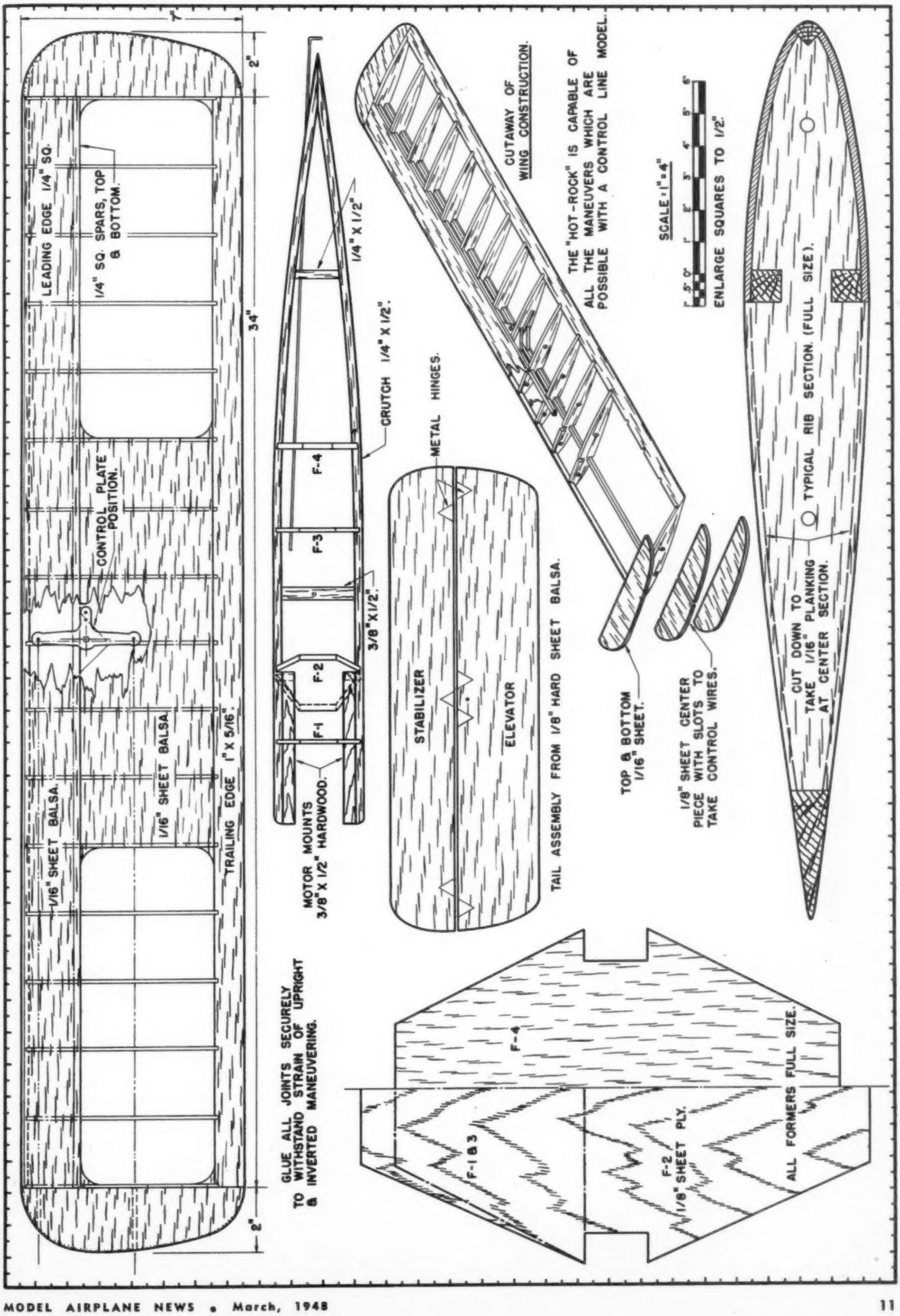
FUSELAGE—The fuselage crutch is laid out on the plans after the motor mounts are glued in place. Plenty of glue on the joints is a must. Take the crutch off the plan and drill mounting holes, cement firewall (with landing gear) in place and cement rudder, stab, former and tailskid to the crutch and allow plenty of drying time. Next, bolt the wing in place by running the bellcrank bolt through a hole in the hardwood crossbrace. Check for zero incidence in the wing and glue it in place. Allow this joint plenty of time to dry. The lower half of fuselage can now be sheeted full length using three sheets of 3/32" balsa, the lower sides first, then trim and sheet the bottom. Cut a slot in the lower right side of the fuselage for the push rod to come out and fasten the elevator in place. You can now hook up the control by binding the push rod, coming out of the wing, to the rod going to the elevator horn. Now sheet the top, cut out for the cockpit and make turtle deck from scrap balsa. Finish with two coats of sanding sealer, two of clear dope and two of colored dope. Make your tank or install a Neaco tank as the original ship had.

FLYING: When you have completed *Hot Rock*, check the controls for equal up and down movement, using a 3" bellcrank (3" between wire holes) and an elevator horn 1/2" long; the elevator movement should be approximately 45° either way. It is suggested that you use a control handle with the flying wires close together—approximately 4" between wires is recommended. With this con-

(*Turn to page 56*)

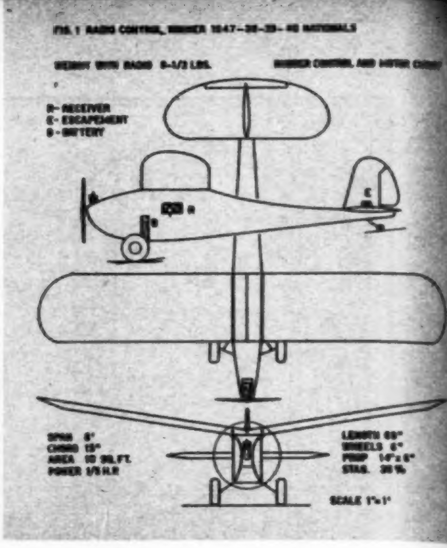


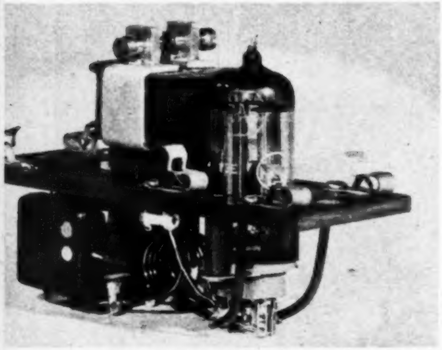
HOT-ROCK
DESIGNED BY
ROBERT TUCKER
SPAN 38"
AREA 261 SQ"
DRONE DIESEL
WEIGHT 26 OZ.
RUDDER 1/8" SHEET.
TAIL SKID 1/16" WIRE.
HEAD REST 1" SQ.
SIDE VIEW
SEMI-FINISHED MODEL.
NOTE: WING IS ON THE BOTTOM OF THE CRUTCH.
SCALE: 1" = 4"
ENLARGE SQUARES TO 1/2".
SIDES, 1/8" SHEET BALSA TOP & BOTTOM.
BIND & SOLDER WELL.
LANDING GEAR IS MADE FROM 1/8" WIRE.
EXPLODED VIEW OF THE FUSELAGE.
2-1/2" WHEELS
FRONT VIEW
ORIGINAL MODEL POWERED BY "DRONE DIESEL".
TOP VIEW
11" PROP. 10" PITCH.



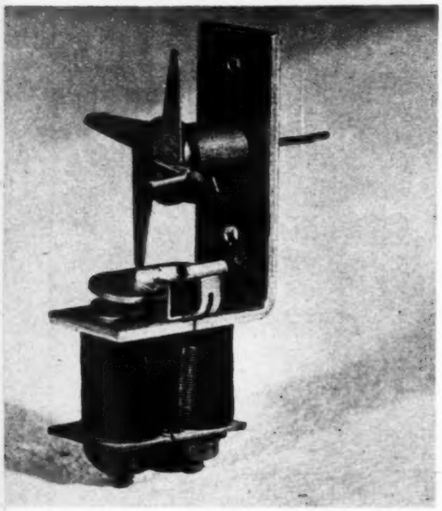
LEADING EDGE 1/4" SQ.
1/4" SQ. SPARS, TOP & BOTTOM.
CONTROL PLATE POSITION.
1/16" SHEET BALSA.
1/16" SHEET BALSA.
TRAILING EDGE 1" X 5/16".
2"
34"
2"
GLUE ALL JOINTS SECURELY TO WITHSTAND STRAIN OF UPRIGHT & INVERTED MANEUVERING.
1/4" X 1/2"
CRUTCH 1/4" X 1/2".
F-4
F-3
3/8" X 1/2".
F-2
F-1
MOTOR MOUNTS 3/8" X 1/2" HARDWOOD.
METAL HINGES.
STABILIZER
ELEVATOR
TAIL ASSEMBLY FROM 1/8" HARD SHEET BALSA.
F-4
F-1 & 3
F-2 1/8" SHEET PLY.
ALL FORMERS FULL SIZE.
CUTAWAY OF WING CONSTRUCTION.
THE "HOT-ROCK" IS CAPABLE OF ALL THE MANEUVERS WHICH ARE POSSIBLE WITH A CONTROL LINE MODEL.
SCALE: 1" = 4"
ENLARGE SQUARES TO 1/2".
TOP & BOTTOM 1/16" SHEET.
1/8" SHEET CENTER PIECE WITH SLOTS TO TAKE CONTROL WIRES.
TYPICAL RIB SECTION. (FULL SIZE).
CUT DOWN TO TAKE 1/16" PLANKING AT CENTER SECTION.

Walter Good helps plane off at '47 Nats. Ship gained extra points by later unassisted takeoffs





The receiver used in the winning plane is shown above, with rudder escapement below



The plane ready to go, at left. Right, Bill holds ship so tiny receiver in large cabin may be seen

Radio Control Can Be Simple

Complication usually causes trouble — study how the Radio Control champs do it the simple way

By BILL and WALTER GOOD

RADIO control flying is fun, especially with simple equipment. Postwar radio gear along with a reliable model and a little practice make possible many fancy maneuvers with just rudder control. Why use more complication if it isn't needed? Simple gear means more time in the air, less time on the ground.

The following material is based on an experience of almost 400 radio-controlled flights. The ship pictured here is the model which won the 1947 Radio Control Event at the Nationals. Previously it also took the 1938, 1939 and 1940 National Events. A description of the model and radio equipment follows, and many maneuvers are detailed so that you yourself may try them.

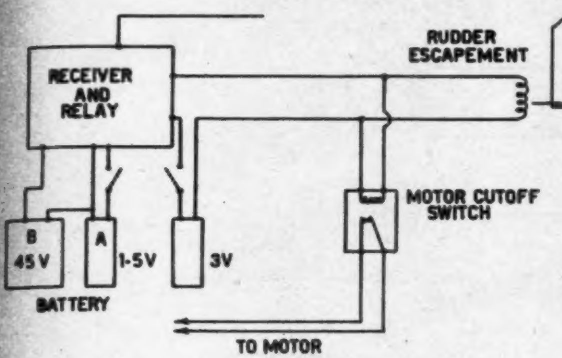
The model is an 8 ft. span, enlarged *Guff* design, weighing 8½ lbs. with radio gear installed. The 10 sq. ft. of wing area using a Grant X Section gives a slow floating flight even with its 13.5 oz. per sq. ft. wing loading.

Fig. 1, a three view drawing, shows the model's proportions and some of the pertinent details. It must be admitted that parts of the model were actually built in 1935, but so many rebuildings have taken place that only a few of the original pieces remain. They are kept well hidden under recent recovering jobs.

During five war years the model rested in an attic, to suffer only the deterioration of its precious six-inch air wheels, which were kindly replaced by Jim Walker.

An *Ohlsson 60* powers the plane with plenty of thrust, and is occasionally throttled back for realistic type flights. Here steep climbs are not desirable. In the past, much of the flying was done with a *Brown Junior* and with a *Dennymite*. The important point is to use a reliable engine which will empty a large tank of gas without a cough or sputter.

FIG. 2 WIRING DIAGRAM OF RADIO CONTROL WITH RUDDER AND MOTOR CUTOFF



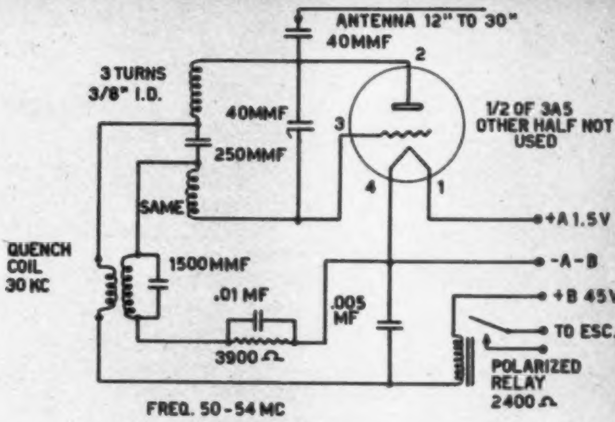


FIG. 3 GOOD BROTHERS RADIO CONTROL RECEIVER

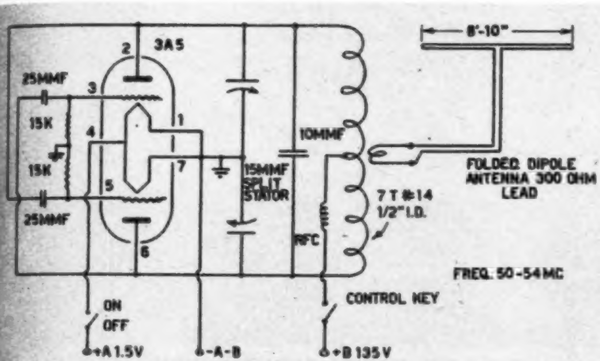


FIG. 4 GOOD BROTHERS RADIO TRANSMITTER

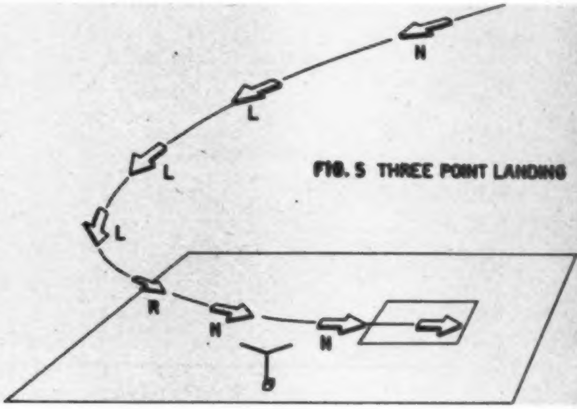


FIG. 5 THREE POINT LANDING

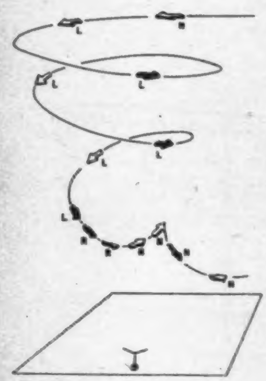


FIG. 7 STALL

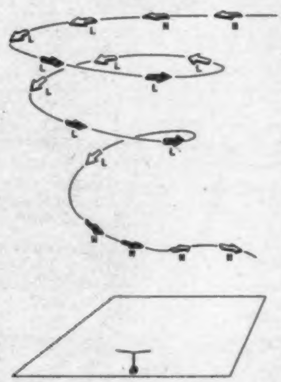


FIG. 8 SPIRAL DIVE

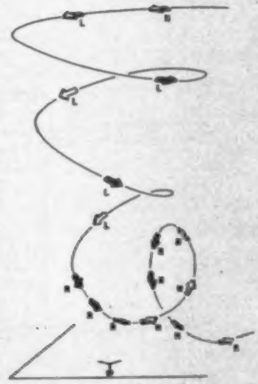


FIG. 6 LOOP

We find a 5 to 7 minute tank just about right. For ignition, two standard D flashlight cells (shades of 1936!) were used to eliminate the booster problem, which simplifies field procedure.

Although this ship is larger than really needed for carrying present day radio gear, it does have several desirable performance features. First, it is very stable—a good quality when you want it to recover quickly from an awkward position. Second, its powered speed and glide speed are about equal. This allows, for a given rudder deflection, the same size of circle whether climbing or gliding. Third, the lack of adverse torque characteristics allows straight flight under power or glide with the same neutral rudder position. These qualities combined with the right amount of spiral stability yields a model which can be "read like a book" when the control practice begins.

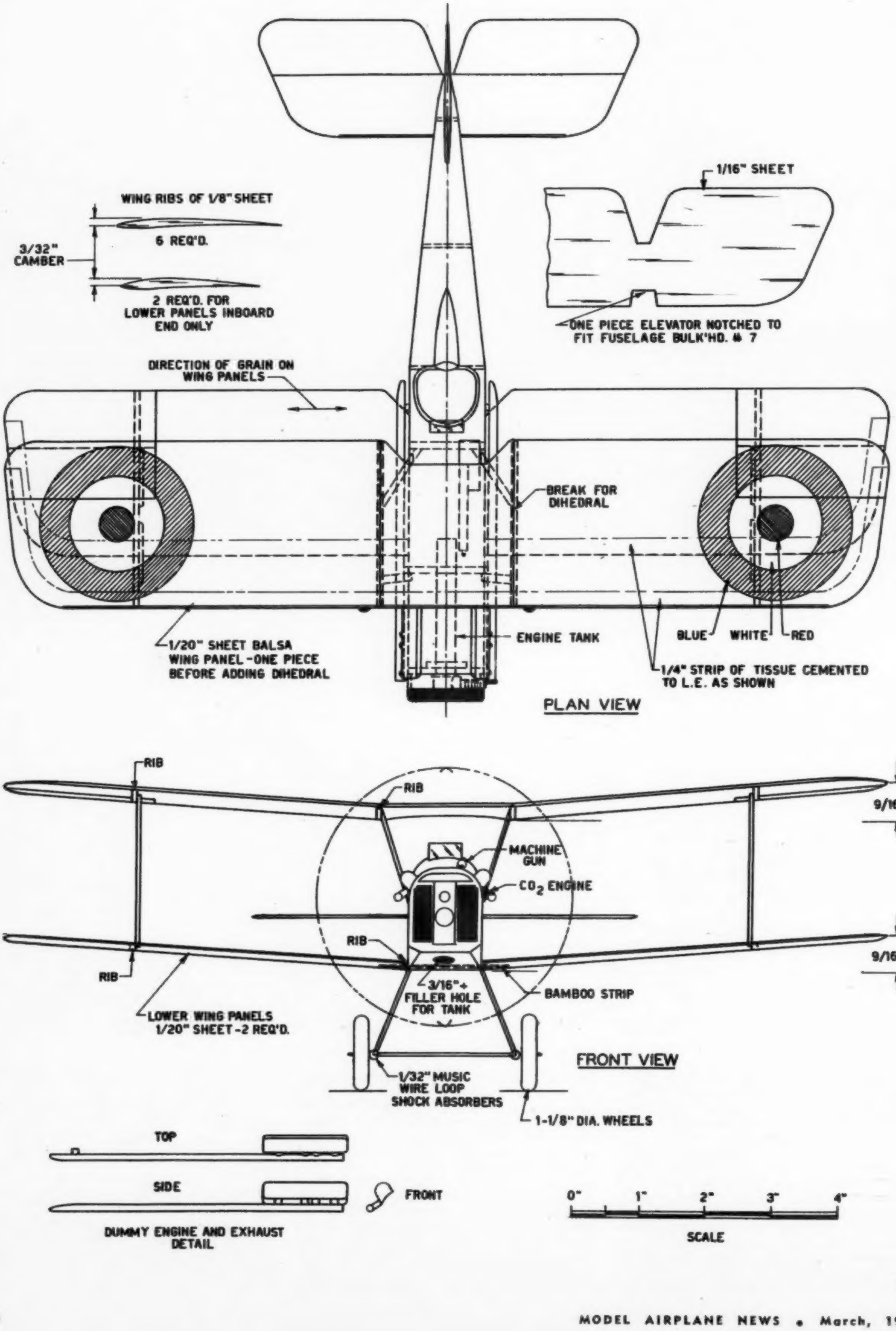
Let us see what radio gear is carried by this plane. First, it carries only a *rudder control system*, which looks rather dwarfed in the immense emptiness of the large cabin. A motor cut-off by radio was recently added and will be explained a little later.

What is needed for rudder control? See Fig. 2. Below are listed the necessary items and also their weights:—

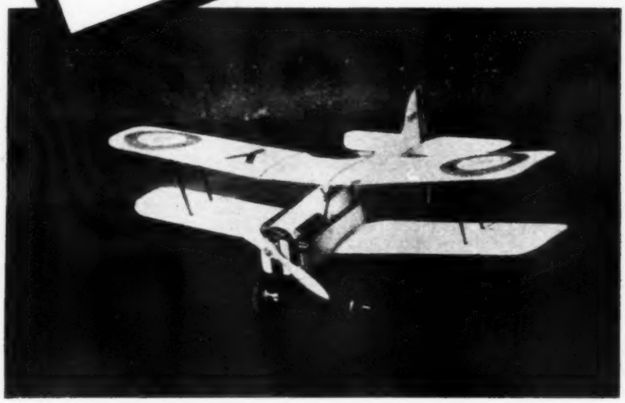
1. Receiver and Sensitive Relay	4.5 Ounces
2. Rudder Escapement	0.7 Ounce
3. Batteries	
45 V "B" Battery	6.0 Ounces
1.5 V "A" Battery	2.0 Ounces
3 V Escapement Battery	1.0 Ounce
Total Radio Weight =	14.2 Ounces

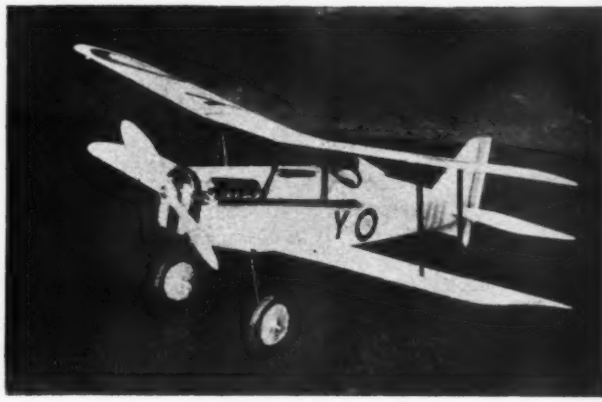
Thus, the radio gear weighs well under one pound, actually a rather light load for this big plane. To be truthful, the writers used slightly larger batteries than listed above, primarily because the plane could easily carry them. Hence, one set

(*Turn to page 46*)


WING RIBS OF 1/8" SHEET
3/32" CAMBER
6 REQ'D.
2 REQ'D. FOR LOWER PANELS INBOARD END ONLY
1/16" SHEET
ONE PIECE ELEVATOR NOTCHED TO FIT FUSELAGE BULK'HD. # 7
DIRECTION OF GRAIN ON WING PANELS
BREAK FOR DIHEDRAL
1/20" SHEET BALSA WING PANEL - ONE PIECE BEFORE ADDING DIHEDRAL
ENGINE TANK
BLUE
WHITE
RED
1/4" STRIP OF TISSUE CEMENTED TO L.E. AS SHOWN
PLAN VIEW
RIB
RIB
9/16"
MACHINE GUN
CO_2 ENGINE
RIB
9/16"
RIB
3/16"+ FILLER HOLE FOR TANK
BAMBOO STRIP
LOWER WING PANELS 1/20" SHEET - 2 REQ'D.
FRONT VIEW
1/32" MUSIC WIRE LOOP SHOCK ABSORBERS
1-1/8" DIA. WHEELS
TOP
SIDE
FRONT
DUMMY ENGINE AND EXHAUST DETAIL
0"
1"
2"
3"
4"
SCALE

BABY SE5





The venerable SE5 flies again — this time as a midget CO-2 powered fighter

by HOWARD G. McENTEE

AFTER a great deal of experiment and many hours of flying the little pusher described in Dec. 1947 M.A.N., and a second model of the same design but carrying tricycle gear, the urge was felt to build something a bit more complex for the tiny *Campus* engine to pull around. As the old World War I SE5 has always been our particular favorite, this biplane was a logical choice. Experienced scale modelers do not need to be told of the advantages the SE5 offers as a free flight scale job, be it powered by rubber, gas or CO-2. For those not so well versed we will briefly enumerate its points of superiority.

First and probably most important, the original ship incorporated considerable dihedral in both wings, and the wings are large enough to afford plenty of area even though the span is small. Second, the tail is quite long, allowing a good tail moment arm with only a slight increase in area over that used in the big ship. Add to these the fairly high thrust line, and the general "right" look of the design as a whole, and it is quickly apparent why this particular biplane has always been such a popular model subject. In a search for authentic plans we remembered Bill Wylam's scale drawings of the original which appeared in December 1944 issue of this magazine. The plans were to a scale of 1/4" equals 1'; exactly double size gave a wingspan of 13 1/4", just right for the A-100 powerplant.

The only deviation from true scale was a slight increase in tail area. However, the model has proven such a stable flier that we feel sure strictly scale size tail surfaces would work adequately. No change in landing gear was needed as a gear of scale height gives comfortable prop clearance. Of course, placed as it is, the undercarriage doesn't afford much prop protection, and furthermore it is so far back that the model almost always noses over, even when landing from a smooth glide, unless the landing surface is very smooth. It was decided to take these risks, however, rather than spoil scale appearance by moving the gear forward.

Now a few words about construction and model weight. We have always been enthusiastic about all-balsa construction. While this method has many advantages, to be successful it is imperative that you choose your wood with care. Not only must thickness and weight be carefully checked, but on those parts that have to be curved—such as the cowling and to a lesser degree the wings—you must use a cut of wood that is amenable to bending. Such wood is variously termed "A cut," slash cut, tangent cut, and so on. The model shown was made throughout of "A cut" wood which proved quite satisfactory.

By choosing grades of wood carefully, the weight was held to .82 oz.; this is light enough to allow very good performance. When selecting your wood be careful to pick only the lightest grades—they will be plenty strong and it is astonishing how the weight goes up if you don't watch this. Aside from the wing and landing gear struts which are of rather hard stock, all other parts are of soft wood.

FUSELAGE—Cut out the two fuselage sides, which run from radiator to tail. These pieces are of 1/32" thick material and should be matched together to be sure both are alike in shape. Moisten both pieces at the rear so they can be bent inward as seen on the top view.

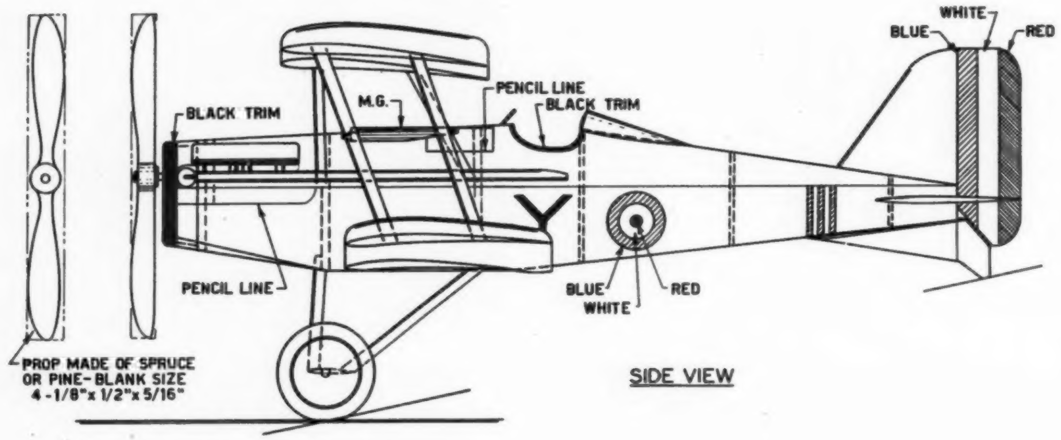
Cut bulkheads 1 (radiator), 2, 3, 4 from soft 1/8", and No. 5 from 1/16" stock; after cutting out the centers for lightness, assemble these five bulkheads and the two sides. (Do not pull the sides together at the rear yet).

At this point let us digress a bit to discuss cement. Though some modelers are not aware of it, certain grades of model cement are very fast drying while others dry rather slowly; for such purposes as assembling the fuselage parts the latter is the only kind to use. As they are put in place, the bulkheads must be shifted a bit to line them up; fast drying glue will set almost as soon as it is out of the tube and hence give you no time for careful lineup of the various parts. Also, we find when working with thin balsa parts that the slow drying cement seems to warp them less when it is hardening.

There are many places where use of quick drying cement will speed up work however; this grade is especially desirable for field repairs, since even major damage can be mended and the ship will be ready for flight again in a short time.

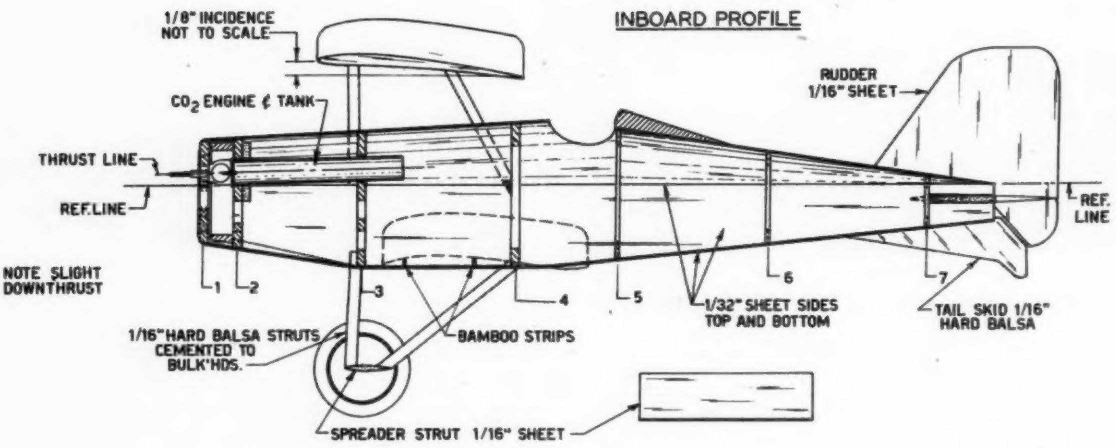
By the time the glue on the front four bulkheads is well set, the moistened rear of the side pieces should be dry. Cut out the final two bulkheads, cement them in place, and close the side pieces at the tail. Next, cut a piece of 1/32" stock to cover the fuselage bottom from tail forward to bulkhead 4. This piece may be a bit wider all around than needed—it can easily be trimmed to size after the glue dries.

(*Turn to page* 53)

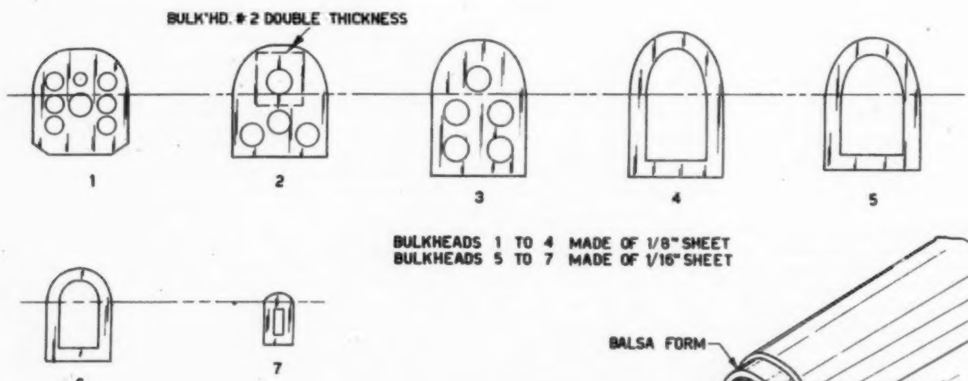


SIDE VIEW

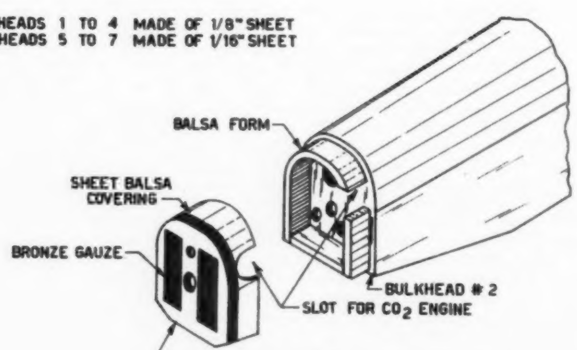
INBOARD PROFILE



NOTE SLIGHT DOWNTHRUST

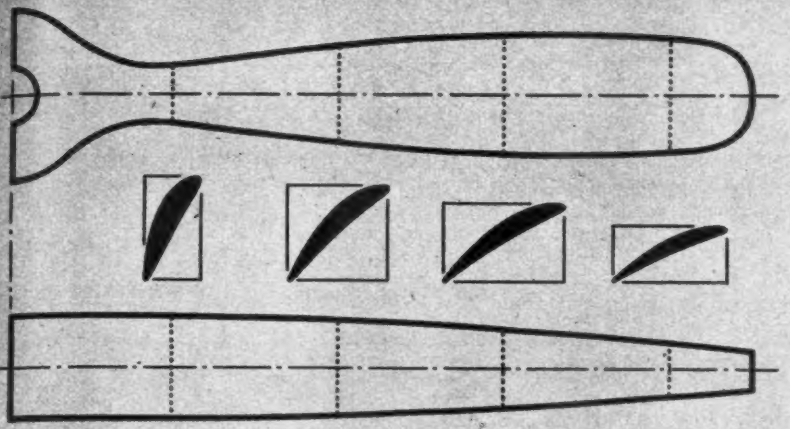


BULKHEADS 1 TO 4 MADE OF 1/8" SHEET
BULKHEADS 5 TO 7 MADE OF 1/16" SHEET



NOTE: RADIATOR ASSEMBLY HELD IN PLACE WITH STRAIGHT PIN

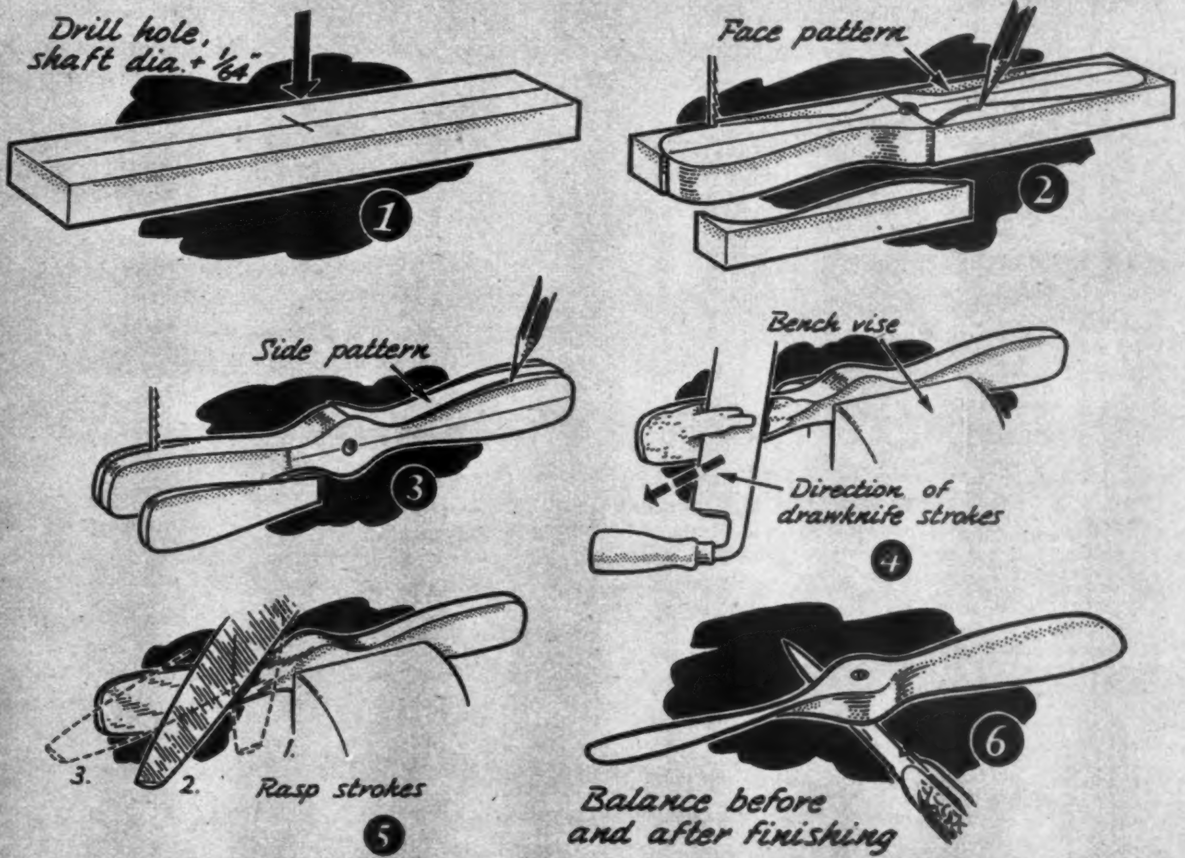
SCALE



Racing Propeller, 9 In. Dia., 12 In. Pitch

CARVE YOUR OWN GAS PROPS

by H. A. THOMAS



PROPELLER-MAKING is nearly a lost art insofar as gas models are concerned. While the manufacturers deserve our appreciation for making nominally priced props available to us in a variety of sizes, pitches, styles, etc. they have at the same time discouraged the average model builder—and particularly the beginner—from learning much first hand information about them. There is a lot of genuine satisfaction in turning out a neat propeller of your own design, and if you go about it in the right way it is not a difficult task at all.

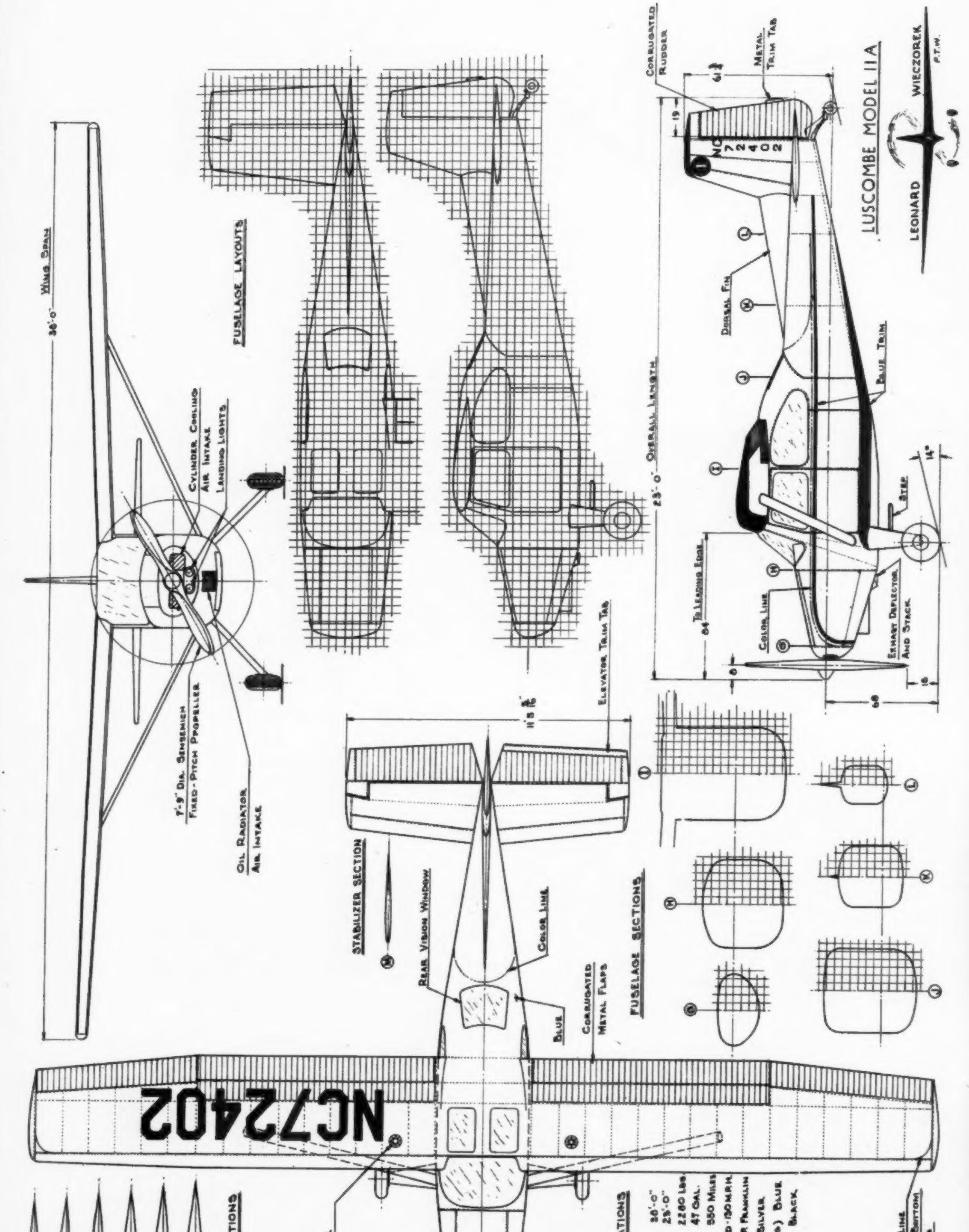
To begin with, you must understand something of propeller design in order to lay out an efficient blank. Errors in pitch angles will result in poor performance regardless of the excellence of your handiwork. Stated in the simplest way, pitch angles reduce toward the tip, since the tip covers a much greater sweep in a single revolution than do parts near the hub. So in most cases the block is tapered in thickness toward the tip. When the block is not so tapered, the blades flare out in width toward the tip as a rule. Just how much taper should be used depends on the face shape of the blade and the angles of pitch desired.

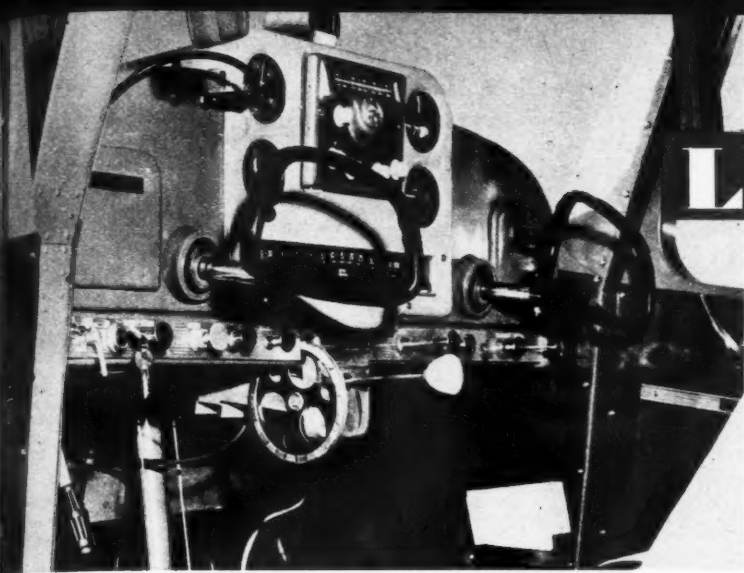
We have included a diagram of a propeller suitable for a fast model with a racing engine of about .60 cu. in. displacement. The procedure of construction we outline is identical, however, whether you make a speed prop with tiny blades—such as this one—or a large paddle-blade free-flight propeller.

You may use sycamore, maple, walnut, mahogany, gum, or woods of similar texture. We suggest red gum—if you can get it—because it has fine woodworking qualities, is tough and uniform, and may be beautifully finished.

After selecting your blank of wood, cut it on a bench saw to proper length, width and thickness. Next mark the centerline and centerpoint in pencil, center-punch the mark and drill it on a drill-press (or carefully with a hand drill) to 1/64" over

(*Turn to page* 58)


LUSCOMBE MODEL 11A
LEONARD WIECZOREK
WING SPAN
36'-0"
CYLINDER COOLING
AIR INTAKE
LANDING LIGHTS
7'-9" DIA. SENSENICH
FIXED-PITCH PROPELLER
OIL RADIATOR
AIR INTAKE
FUSELAGE LAYOUTS
CORRUGATED RUDDER
METAL TRIM TAB
NC72402
DORSAL FIN
BLUE TRIM
23'-0" OVERALL LENGTH
TO LEADING EDGE
COLOR LINE
EXHAUST DEFLECTOR AND STACK
STEP
ELEVATOR TRIM TAB
STABILIZER SECTION
REAR VISION WINDOW
COLOR LINE
BLUE
CORRUGATED METAL FLAPS
FUSELAGE SECTIONS
WING TANK
FUEL CAP
WING SECTIONS
COLOR LINE
TOP & BOTTOM
OF WING
SPECIFICATIONS
SPAN 36'-0"
LENGTH 23'-0"
GROSS WT. 2280 LBS.
FUEL CAPACITY 47 GAL.
RANGE 550 MILES
CRUISING SPEED - 130 M.P.H.
ENGINE - 150 H.P. FRANKLIN
COLOR - ALL SILVER
TRIM (STRIPING) BLUE
DETAILS - BLACK



PLANE ON THE COVER STORY

LUSCOMBE SEDAN

by ROBERT McLARREN

NINETEEN forty-eight will be remembered many years hence as the dawn of the flying sedan, for all indications point to the four-place airplane as the new standard size personal aircraft. Two-place lightplane production continued to fall drastically the last half of 1947, and industry officials see no slacking off of this steady decline in production and sales. While oldtimers insist there will always be a market for the two-place lightplane, zooming into the limelight is the four-place sky sedan, the private car of the sky.

While production of two-place types declined last year, four-place sales rose steadily and the industry expects to produce about the same dollar volume of personal aircraft during 1948 that it did during 1947 but these dollars will be earned by four-place designs. Why four places? For the same reason that the five-passenger car outsells the coupe: there's room for the family!

The four-place personal airplane pilot is a different man entirely than the two-place airplane man, believe it or not! While the two-place pilot is a young man of 28-30, the four-place owner is 40 years of age. The latter has lost interest in the mere pride of flying and no longer feels that a demonstration of his ability to fly an airplane is sufficient compensation for the investment in time and money that a Sunday morning hop requires. Instead, he is interested in the *use* he can get out of his airplane. He can't be bothered with high performance, it's too much trouble to work at the job of flying a "hot" airplane. Instead, he wants to fly his family or friends cross-country on a visit or a business trip. For such flying he wants safety, comfort and economy in that order. To win that market, a four-place airplane has to be designed in direct answer to these requirements.

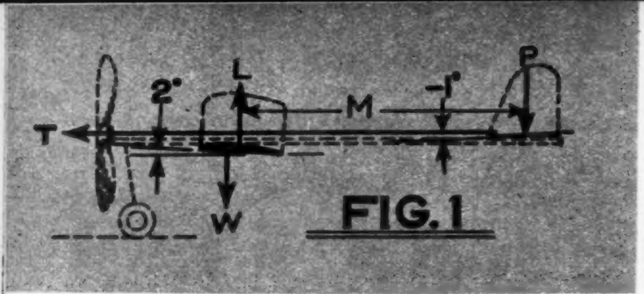
With Stinson dominating the four-place field for the postwar years, Luscombe engineers and sales executives had to plan long and hard on their new *Silvaire Sedan*. There could be no doubt about it: the Luscombe had to be a superior airplane, both in performance and usefulness. How well they met that challenge is the story of our Plane on the Cover: the Luscombe *Silvaire Sedan*.

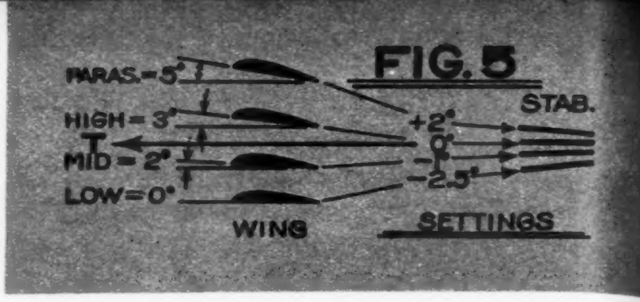
Luscombe's approach to a four-place version of its highly successful two-place *Silvaire* was that of simplicity. The new design had to be simple to manufacture, and that meant simplicity of line and assembly. As a result the new *Sedan* is not a beautiful airplane; its lines are straight and harsh, but Luscombe doesn't mind criticism on this score. The straight leading and trailing edges of the wing mean economy for, instead of 30 or more ribs of different sizes (required in a tapered wing) the *Sedan* uses only one size nose rib and center rib throughout the wing. Instead of complex stiffener extrusions extending up and down the wing spanwise, Luscombe has made generous use of corrugated skin and a heavy single spar. Even the strut is simple: a single unit extending from lower fuselage to wing spar.

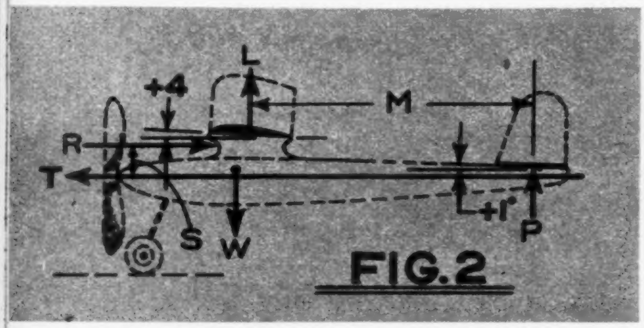
The fuselage is humped over the cabin and cuts sharply down aft of the rear seats both to provide rear view and to reduce the size of fuselage where it isn't needed. To make up for this loss in lateral area, a generous dorsal fin extends from the rear of this hump to the fin, providing directional stability and resistance to spinning. The tail surfaces are full cantilever, eliminating the need for struts or brace wires.

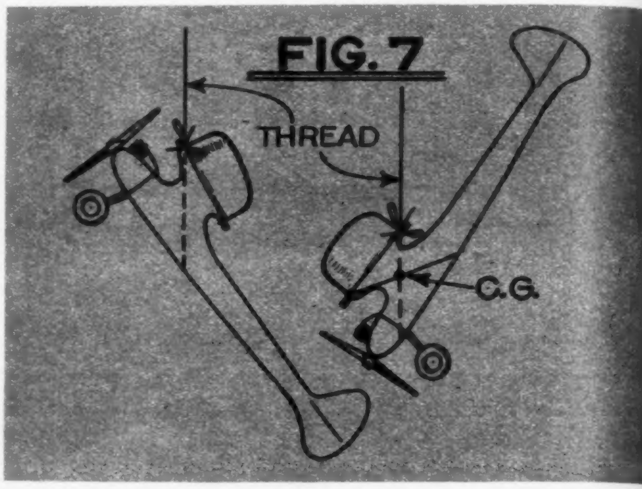
The landing gear is rugged but simple: only a single full cantilever strut with small airwheels

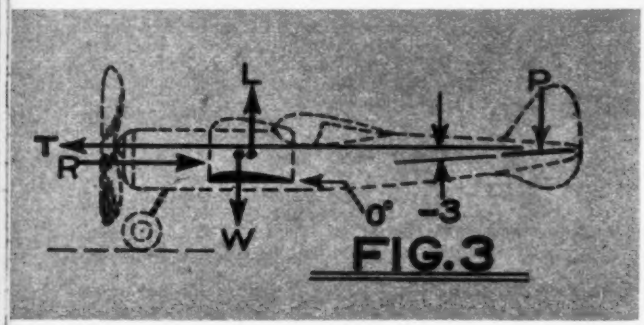
(Turn to page 59)

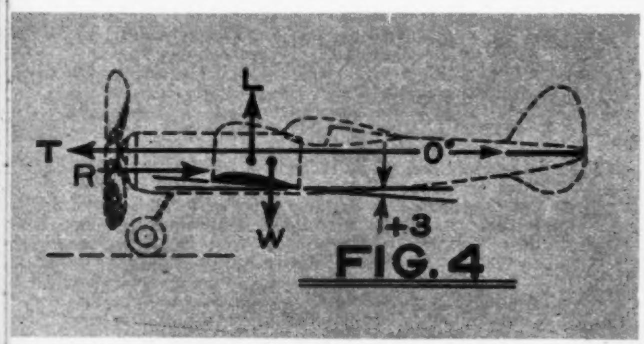












design forum

by CHARLES H. GRANT

IF YOU have attended a number of model airplane contests, no doubt you were impressed by the variety of antics and unlooked for maneuvers of miniature planes. In fact, probably one of the greatest attractions for spectators, if not contestants, is the possibility of one or more of these little craft going through their paces like a full scale fighter plane in actual combat. On the whole, *precise* and successful flights have been very much in the minority. What is the reason for this? Let us see if we can track it down.

The majority of contest fliers build their planes from successful kits—kits of contest winners—yet many give performance which is nothing like the original plane. Your completed ship may in all respects look exactly like another plane which performed beautifully, yet yours persists in carrying out some uncalled for maneuver. It may circle to the left without apparent reason; it may stall and then dive suddenly. Probably the trouble is one common to 999 out of every 1000 airplanes: it is incorrectly *adjusted.*

The kit manufacturer puts out a beautiful looking airplane and gives you the correct proportions, but he often fails to give you complete adjustment data. Consequently, you might as well not have built the airplane as far as flying it is concerned. In fact, an incorrectly adjusted plane seldom lasts more than one or two flights before it is reduced to kindling wood.

What do we mean by adjustment and how does it affect the flight? To be prop-

(*Turn to page 68*)

FLYING FLEET CANUCK

AS LAND OR SEAPLANE, THIS *CANUCK* FLIES EITHER WAY

by EARL STAHL

AT the close of the war many plane manufacturers turned their attention to the production of civilian aircraft in the belief that a vast new market was to be unfolded. All of the old makers of light aircraft were back with improved models, and they were joined by a number of former military plane producers who were entering the field to mass produce personal planes with their vast resources of money, experience and facilities. Events that followed are now history, for in less than a year sales slumped and what had appeared to be a gigantic market almost evaporated. A number of builders were forced into bankruptcy. A few of the former war plane producers simply suspended production after claiming to have lost millions through their ventures. Others, largely the old established personal plane builders, slowed to building their products in limited numbers. It became apparent that every family did not yet want a plane, or at least was not ready to buy one.

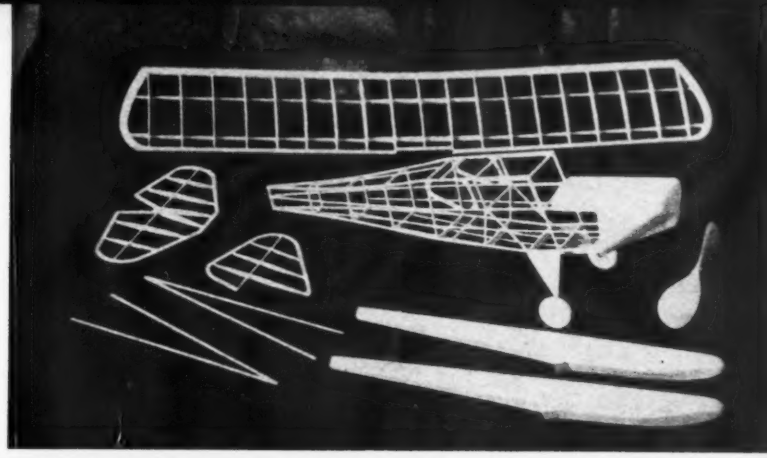
In Canada a similar condition is apparent. Slackening customer demand has forced the suspension of production of the Fleet *Canuck*, our flying scale model subject for this month. Needless to say this does not reflect on the quality of this craft, which was conceived to meet the difficult conditions encountered in the all-season flying in the north, but rather it denotes the same overproduction as compared to limited market that exists in our country.

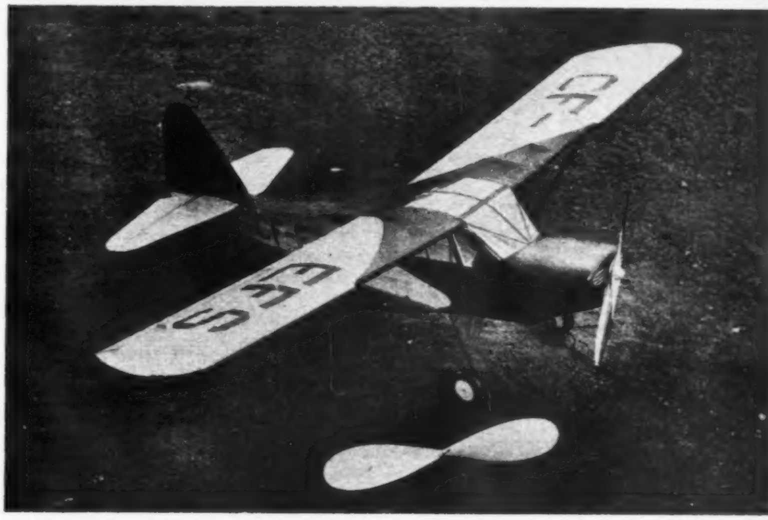
Equally adaptable to use with wheels, floats and skis, the *Canuck* is capable of operating from most any place a plane can. From first hand observation we can report that it is a sturdily built, comfortable ship of wide utility. It carries a good load at a respectable cruising speed of about 100 mph, and it is as easy to fly as the average American light plane. Its engine is a Continental of 85 hp.

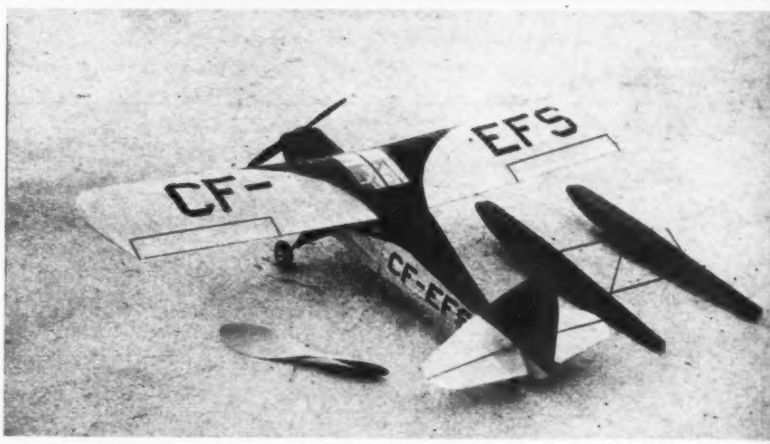
Our model *Canuck* is just as versatile as the real ship since it is designed for speedy conversion from wheels to floats. You who have never tried float models on neighborhood ponds and water puddles have a real treat in store, for seeing a little rubber powered ship skim across the water and then arc skyward is a refreshing change from the usual flying. There was no snow in balmy Virginia when the test ship was developed or skis would surely have been tried, too. From the standpoint of ease of construction and performance in flight this model leaves little to be desired—so on with the construction which is carried out in this manner:

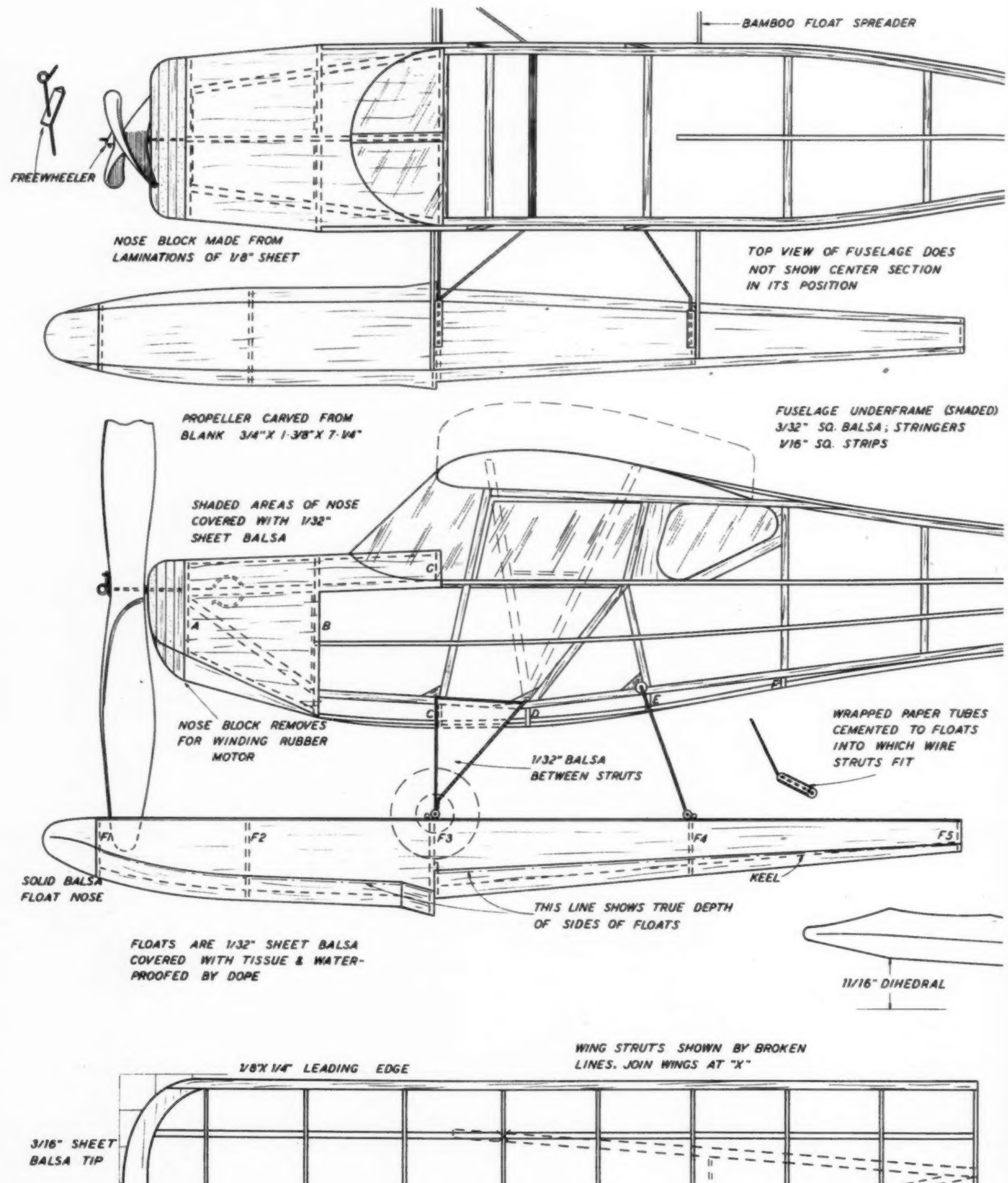
Start by building the fuselage; this consists of an underframe of 3/32" sq. strips and uprights about which formers and stringers are mounted to give the scale appearance. This underframe establishes the correct angular placement of wing to stabilizer as well as their relation to the thrust line, so reproduce it accurately. Build the two sides of the underframe, one above the other, then separate them and

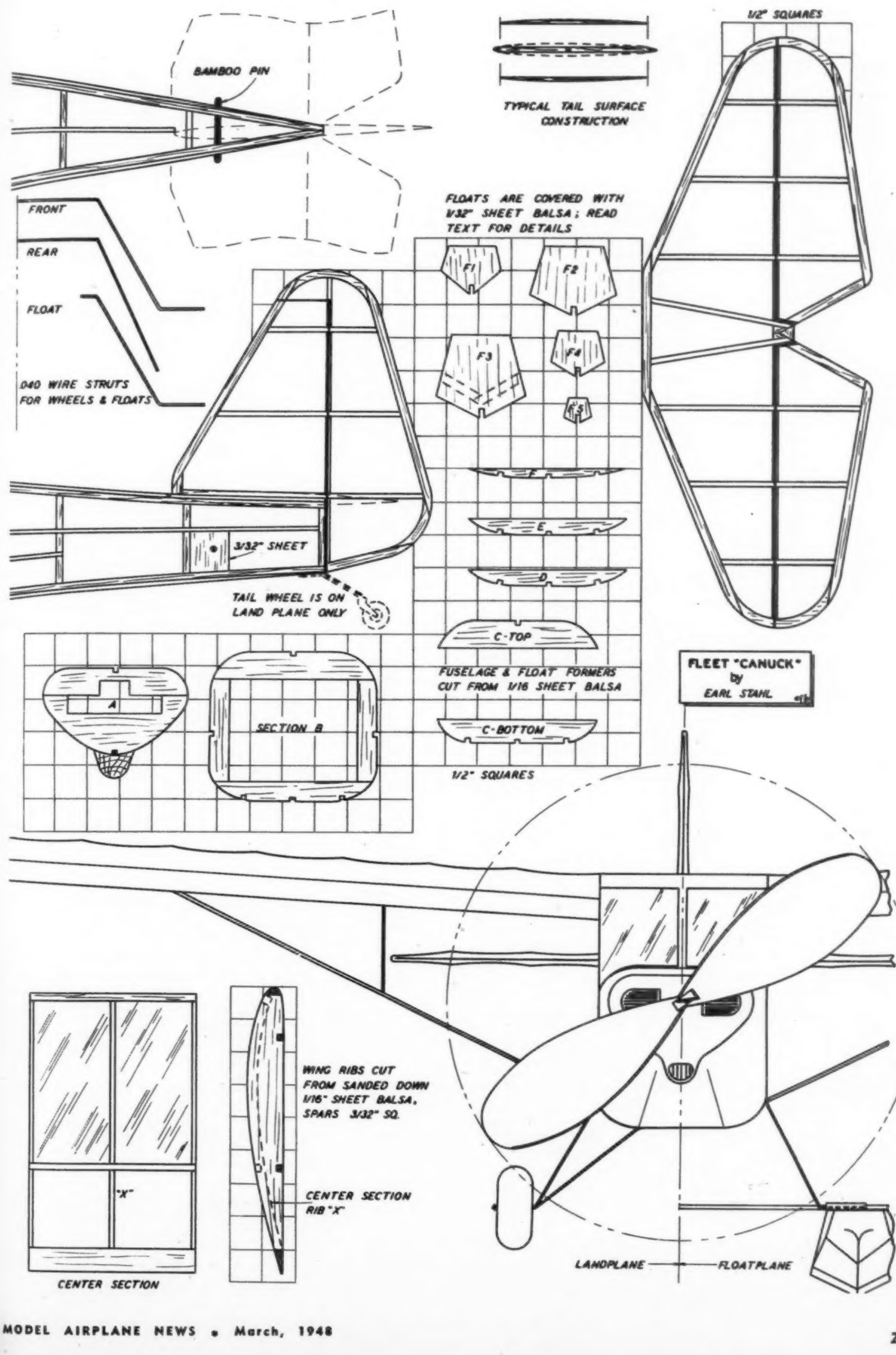
(*Turn to page* 61)



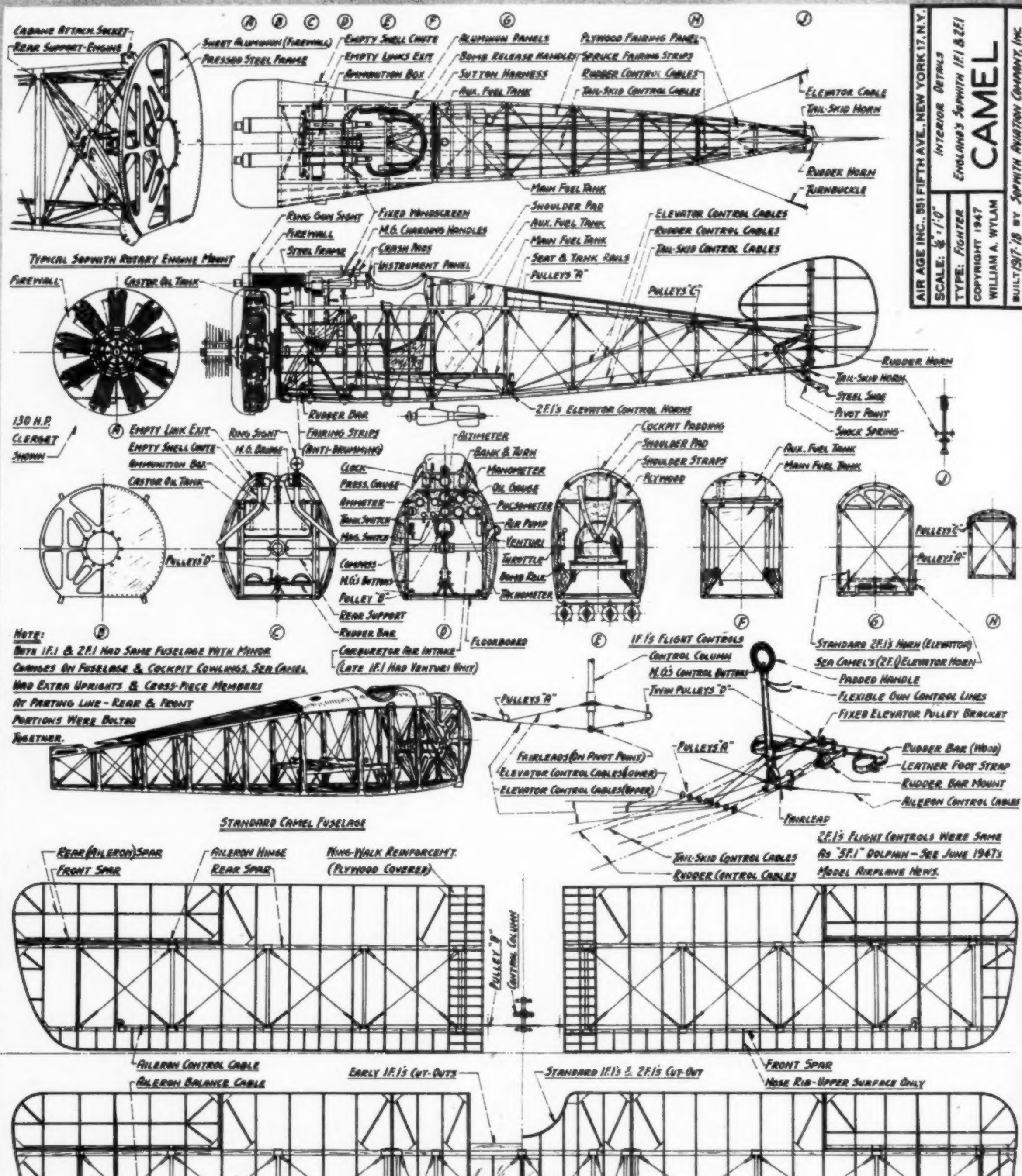




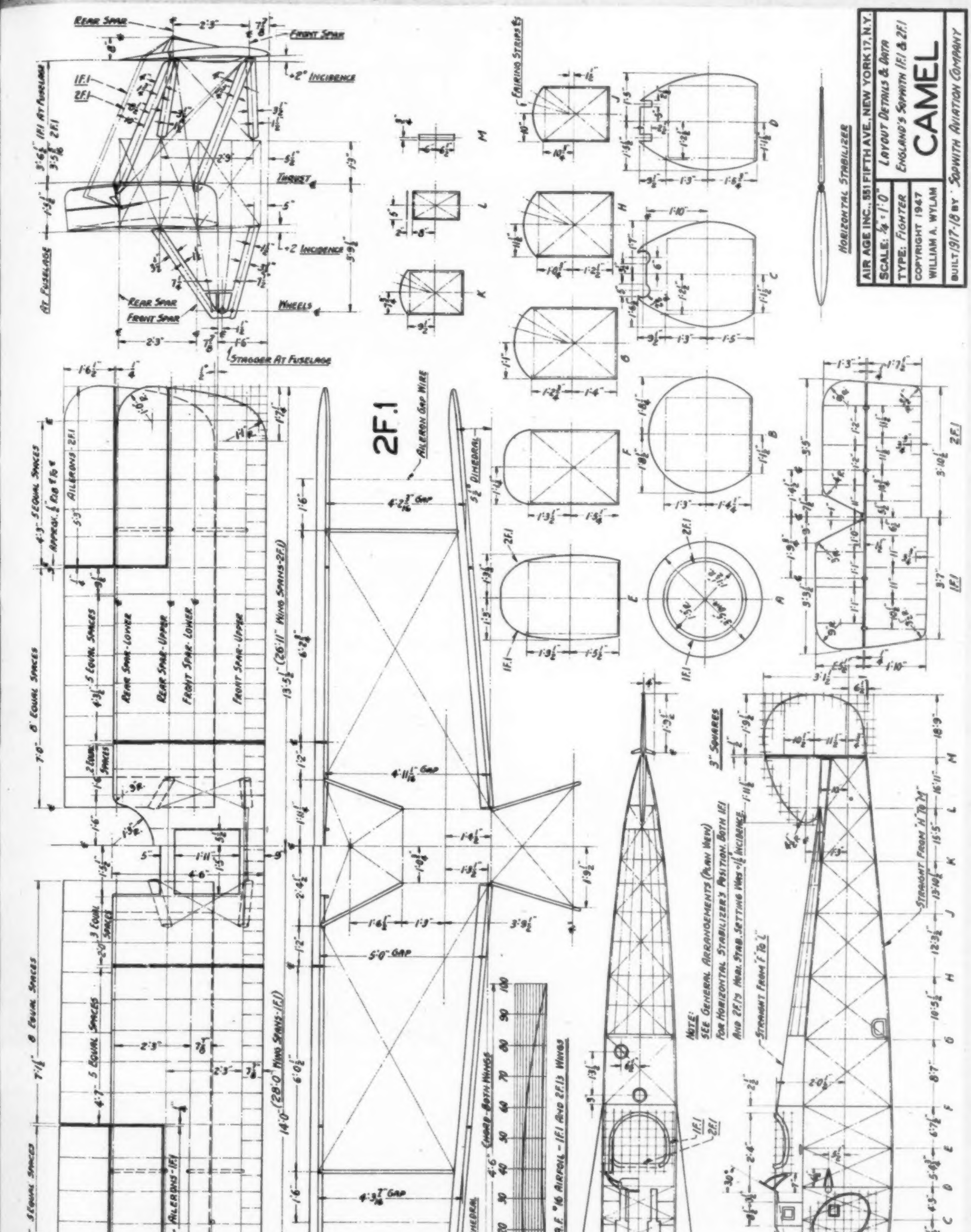

BAMBOO FLOAT SPREADER
FREEWHEELER
NOSE BLOCK MADE FROM LAMINATIONS OF 1/8" SHEET
TOP VIEW OF FUSELAGE DOES NOT SHOW CENTER SECTION IN ITS POSITION
PROPELLER CARVED FROM BLANK 3/4" X 1-3/8" X 7-1/4"
FUSELAGE UNDERFRAME (SHADED) 3/32" SQ. BALSA; STRINGERS 1/16" SQ. STRIPS
SHADED AREAS OF NOSE COVERED WITH 1/32" SHEET BALSA
C
A
B
C
D
E
F
NOSE BLOCK REMOVES FOR WINDING RUBBER MOTOR
WRAPPED PAPER TUBES CEMENTED TO FLOATS INTO WHICH WIRE STRUTS FIT
1/32" BALSA BETWEEN STRUTS
F1
F2
F3
F4
F5
SOLID BALSA FLOAT NOSE
KEEL
THIS LINE SHOWS TRUE DEPTH OF SIDES OF FLOATS
FLOATS ARE 1/32" SHEET BALSA COVERED WITH TISSUE & WATER-PROOFED BY DOPE
11/16" DIHEDRAL
WING STRUTS SHOWN BY BROKEN LINES. JOIN WINGS AT "X"
1/8"X 1/4" LEADING EDGE
3/16" SHEET BALSA TIP
SIMULATE CONTROL SURFACES WITH THIN STRIPS OF BLACK TISSUE
1/2" SQ'S
1/8"X 3/8" TRAILING EDGE


BAMBOO PIN
TYPICAL TAIL SURFACE CONSTRUCTION
1/2" SQUARES
FRONT
REAR
FLOAT
.040 WIRE STRUTS FOR WHEELS & FLOATS
FLOATS ARE COVERED WITH 1/32" SHEET BALSA; READ TEXT FOR DETAILS
F1
F2
F3
F4
F5
F
E
D
C-TOP
C-BOTTOM
3/32" SHEET
TAIL WHEEL IS ON LAND PLANE ONLY
A
SECTION B
FUSELAGE & FLOAT FORMERS CUT FROM 1/16 SHEET BALSA
1/2" SQUARES
FLEET "CANUCK" by EARL STAHL
WING RIBS CUT FROM SANDED DOWN 1/16" SHEET BALSA, SPARS 3/32" SQ.
"X"
CENTER SECTION RIB "X"
CENTER SECTION
LANDPLANE
FLOATPLANE

This is Part 2 of the Camel Series. Next



will carry the Clerget motor used in this ship



WYLAM MASTERPLAN ● WYLAM MASTERPLAN

AIR WAYS

News of Model Airplane Experimenters All Over The World

INTERNATIONAL RECORDS. We see in the daily papers from time to time items mentioning that this or that foreign country has set a new International record in model plane flying. The latest is a note that Russia has established a gas model altitude record of 13,701.6 ft., and a rubber duration record of 52 min. 15 sec.

In our August 1946 issue the subject of International records was covered quite thoroughly under "Model Airplane Newsletter." We haven't the space to reprint this material here or to list all the records that have been set by such countries as France, Russia, Belgium, Switzerland and Italy. However, anyone interested may obtain complete information on this subject from the Academy of Model Aeronautics which is official American representative on model matters of the Federation Aeronautique Internationale.

To us it has long seemed a sad commentary that the United States, with its millions of model builders, advanced equipment, and general know-how in model matters, doesn't hold a single world record. Naturally, the rules under which these records are flown differ from our present contest rules. But our contest hounds have no trouble producing winners whenever contest rules are changed—why not study the International rules, and try for a few World Records?

Briefly, the records are divided into three groups: landplanes, seaplanes, and gliders. Powered planes of course are split into rubber and gas groups; and there are various categories in hand launched and ROG classes for duration, distance, altitude, and speed.

As an example, the gas ROG speed record is held by France with a speed just over 28 mph. This to be sure is free flight, over a 165 ft. course, but doesn't it give you speed merchants ideas? There are a total of 18 records, no age limits, and the field is wide open. Let's put the United States in World Record listing!

"RUSHY" ANSWERS. In "Model Airplane Newsletter" of our November 1947 issue, some comments were made on English airplane modelling in general, and in particular about the comments made by C. S. Rushbrooke, Editor of our English contemporary "The Aeromodeller," who visited the New York area last winter. Because of travel restrictions and lack of time, Mr. Rushbrooke had to visit the States in the winter and had little time to leave New York. Consequently, he saw only some indoor control line flying—of which he took a rather dim view—and his notes on American modelling were a bit critical. He has since been in touch with us and endeavored to clarify some of his comments. His latest letter presents so many angles on English modelling that we feel it will be of interest to our readers and therefore reprint excerpts from it here.

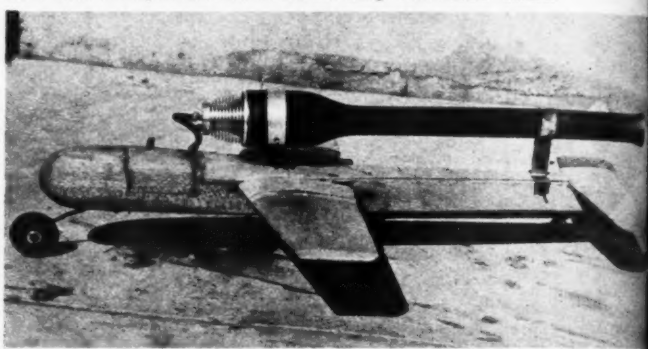
"Having just received—and read with my usual diligence—Nov. 1947 issue of 'M.A.N.', I hasten to pen this disclaimer in case your readers may have formed the opinion that I have a one-track mind, and returned this 'land of austerity' full of critical opinions of American modelling. Nothing could be farther from the truth, as I have been able to keep very well informed of the hobby in your country through various mediums, and fully appreciate the great scope, progress and unbounded enthusiasm existing in the States.

"My fault is that I did not make it clear in the article describing my trip that my remarks were devoted solely to incidents and hearsay gleaned during that hectic two weeks, and no one regrets more than myself that circumstances demanded that my initial visit to America had to be timed at a season when aeromodelling is more or less hibernating.

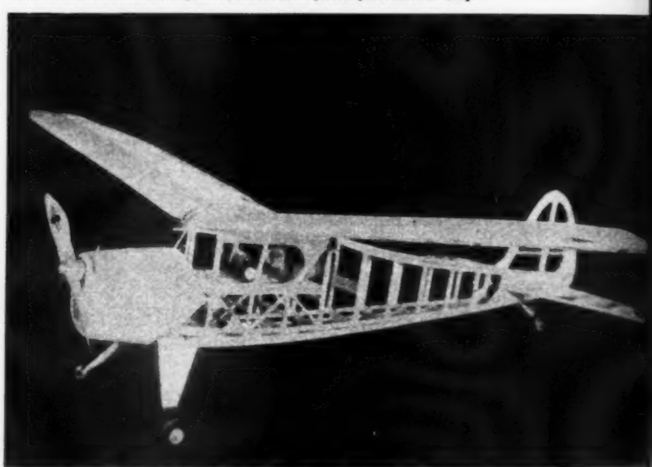
"It appears that you are hurt mainly by the inclusion of a photo apparently disparaging the American type of model. Sorry—you missed the boat there, or should I say you didn't connect the subtle English humor behind the caption—for which I cannot blame you! What we were driving at there was the fact that we see so many designs and pictures of super slinky jobs, and then find that a contraption which

(*Turn to page* 39)

No. 1 John R. Hill, Jr. and John H. Dickson using "twin handle" control

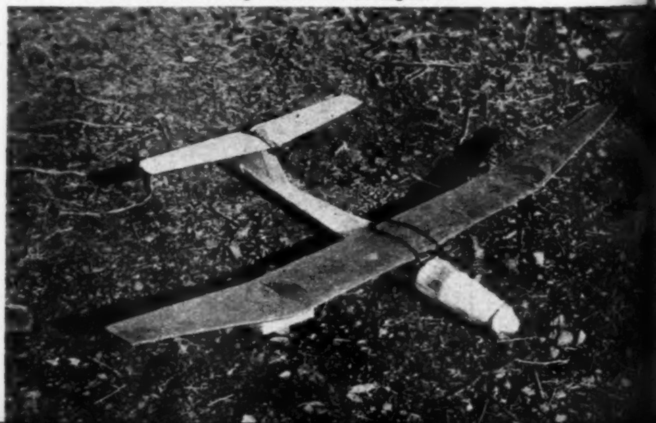


No. 2 Howard H. Lundquist's successful jet experimental ship



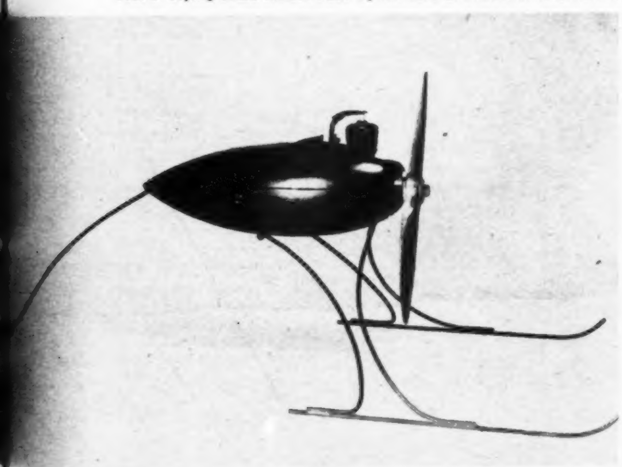
No. 3 Jose Navarro's free flight cabin ship, powered by an *Ohlsson* 23

No. 4 T. Aoki built this soaring model from an English kit



No. 5 Betty D. Pike launching her first plane

No. 6 Flying scale model built by Richard S. Snedeker is a P-40D

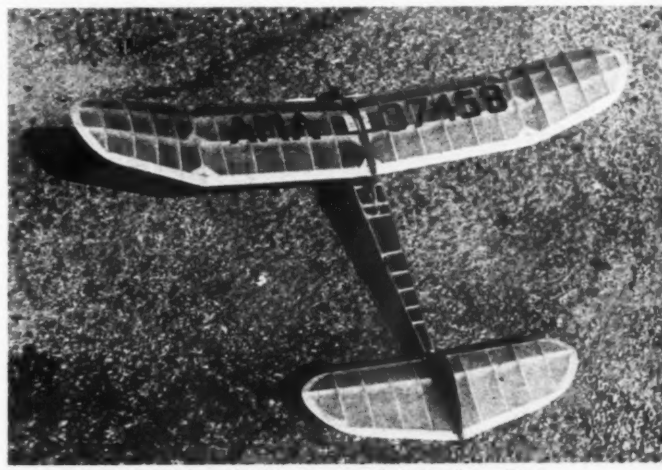


No. 7 Glen Peterson's original "Ice Bug"

No. 8 1" scale Taylorcraft scaled down from big ship by Stan Staples

No. 9 Beautiful Beechcraft control liner built by John Y. Bella

No. 10 Hugh Byers' with his excellent flying control line jobs



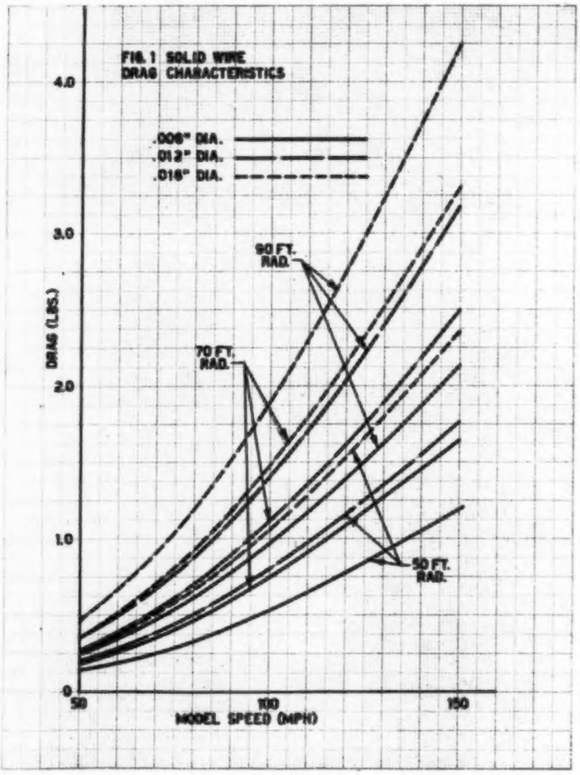
No. 11 "Ay Jay" built from M.A.N. plans, contributed by James Poux

No. 12 J. Warren Kohler's asymmetrical design class I control speedster

It takes power to drag your lines through the air—read how to save it

Those Important WIRES

By R. B. JOHNSTON



AS ONE looks at the many problems of control line flying, it becomes apparent that a scientific analysis of the forces acting on the wires is a prime necessity. Surprising as it may seem, the drag of the control wires is very important. In fact, as will be demonstrated below, the drag of the wires may be much greater than that of the model.

Experienced control line modellers have probably noticed the backward curve of the control wires as the model is in flight. This curve is caused by the drag of the line. Our problem is to calculate the drag of the control wires and the division of the wire drag between the model and the modeller.

To do this problem properly we shall have to resort to a little calculus; but if you have trouble with mathematics, don't let it worry you, since you can still use the curves which are given here.

To begin, let V equal the velocity of the model and v the velocity of the wire at any point. Let x equal the distance along the wire to the point under consideration. Let L equal the length of the wires. Now when

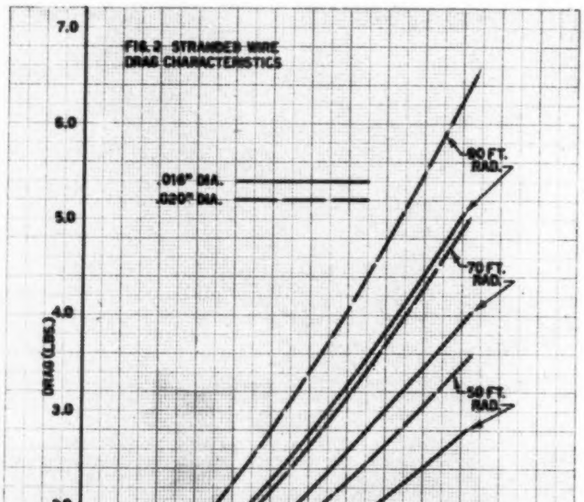
$x=0,\ v=0$

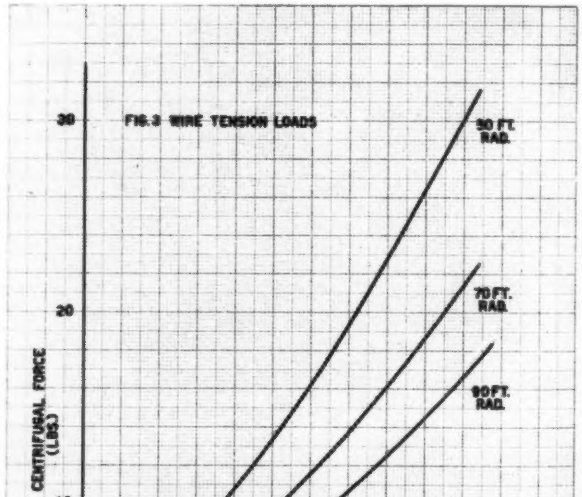
and when

$x=L,\ v=V$

therefore at any point

$$v=\frac{x}{L}V$$





Now, we know that

$D = \frac{1}{2}\rho v^2 y l C_D$

where D is the drag, ρ is the air density constant, v is the velocity again, y is the wire diameter, l is the wire length and C_D is the drag coefficient. Then the drag, dD, of an infinitestimal length of wire, dx, is

$dD = \frac{1}{2}\rho v^2 y\, dx\, C_D$

but

$v = \frac{X}{L} V$

so

$dD = \frac{1}{2}\rho \left(\frac{X}{L}V\right)^2 y\, C_D\, dx$

And grouping all of the constants together, we have

$dD = \frac{1}{2}\rho \left(\frac{V}{L}\right)^2 y\, C_D\, x^2\, dx$

Now, starting to use our calculus we may say that the total drag of the wire D is

$D = \frac{1}{2}\rho \left(\frac{V}{L}\right)^2 y\, C_D \int_0^L x^2\, dx$

—and finally arrive at the expression

$D = \frac{1}{6}\rho V^2 L y C_D$

Inserting the proper value for C_D and using sea level standard air density, we have

$D = .000086\, V^2 L\, y$

where V is the model velocity in mph, L is the radius of the circle in feet, and y is the wire diameter in inches.

Since the normal control line model uses two wires, the drag value must be doubled.

The above evaluation is only a part of the story when it comes to wire drag. As mentioned earlier, the wires are curved backwards, which indicates that the centroid of the drag we calculated above acts at some point inboard of the model. This means that only a part of the total wire drag acts on the model. If we take the moment of the drag force about the center of the circle, we must integrate the equation:

$M = \frac{1}{2}\rho \left(\frac{V}{L}\right)^2 y\, C_D \int_0^L x^3\, dx$

which becomes

$M = \frac{1}{8}\rho V^2 L^2 y\, C_D$

and the centroid of the drag is

$\bar{X} = \frac{M}{D} = \frac{3}{4}L$

—which means that ¾ of the wire drag is taken by the model and ¼ by the pilot. Of course, if the pilot does a little "whipping" the wire drag figures calculated here will be reduced by the "whipping."

Fig. 1 shows the drag force on the model due to two solid-type control wires. Note that the total drag force of the two wires is 1⅓ times this amount, but that the other ⅓ is taken by the modeller, even if he is not "whipping."

Stranded control wires are seldom used for speed models, but should you wish to compute the drag of stranded wires the formula is

$D = .000103\, V^2 L\, y$

and representative drag forces on the model for two wires are given in Fig. 2.

No calculations have been made of the drag of swivels or wire splices. Needless to say, the connections between the wires and the model should be given careful attention so that the drag may be as small as possible.

In order that we may fully understand the effect of the wires on the model, we must calculate the wire tension as well as the wire drag. The load in the wires due to the tension force will determine the minimum size of wire that may be used with a given model and will thus affect the wire drag. This tension force depends upon several items such as engine torque, rudder offset and centrifugal force. Since the torque force and rudder offset depend on airplane and engine characteristics, we cannot calculate the effect of these upon the wire tension.

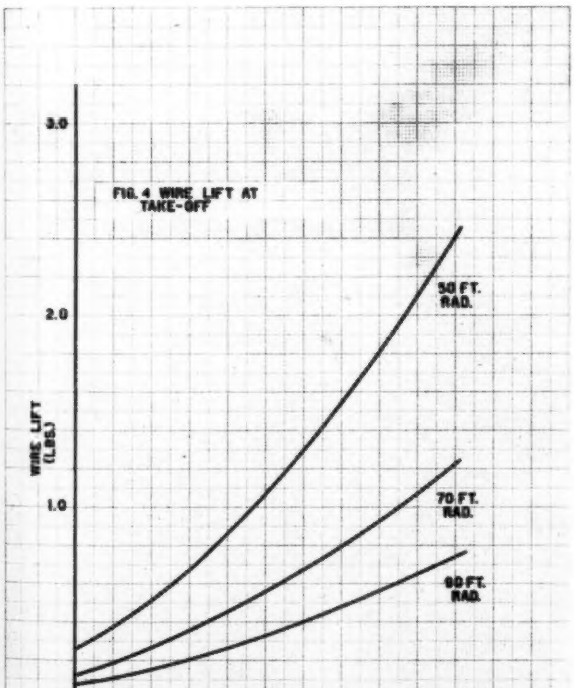
The centrifugal force can be computed from the formula

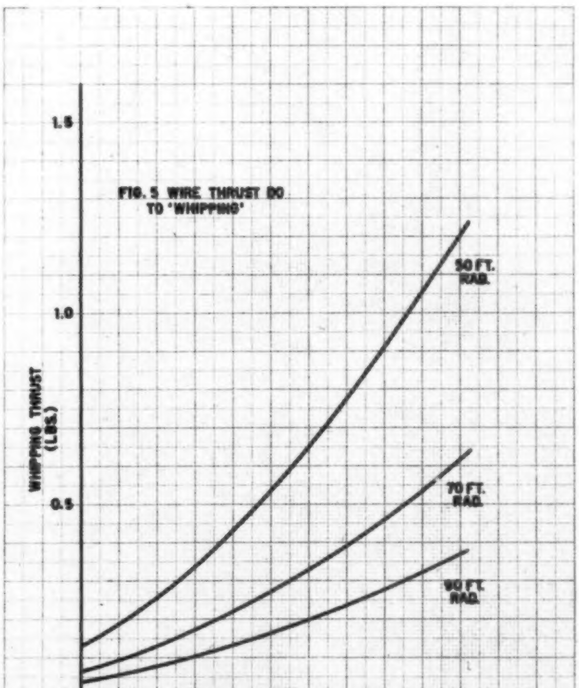
$C.F. = .0669\, W \frac{V^2}{R}$

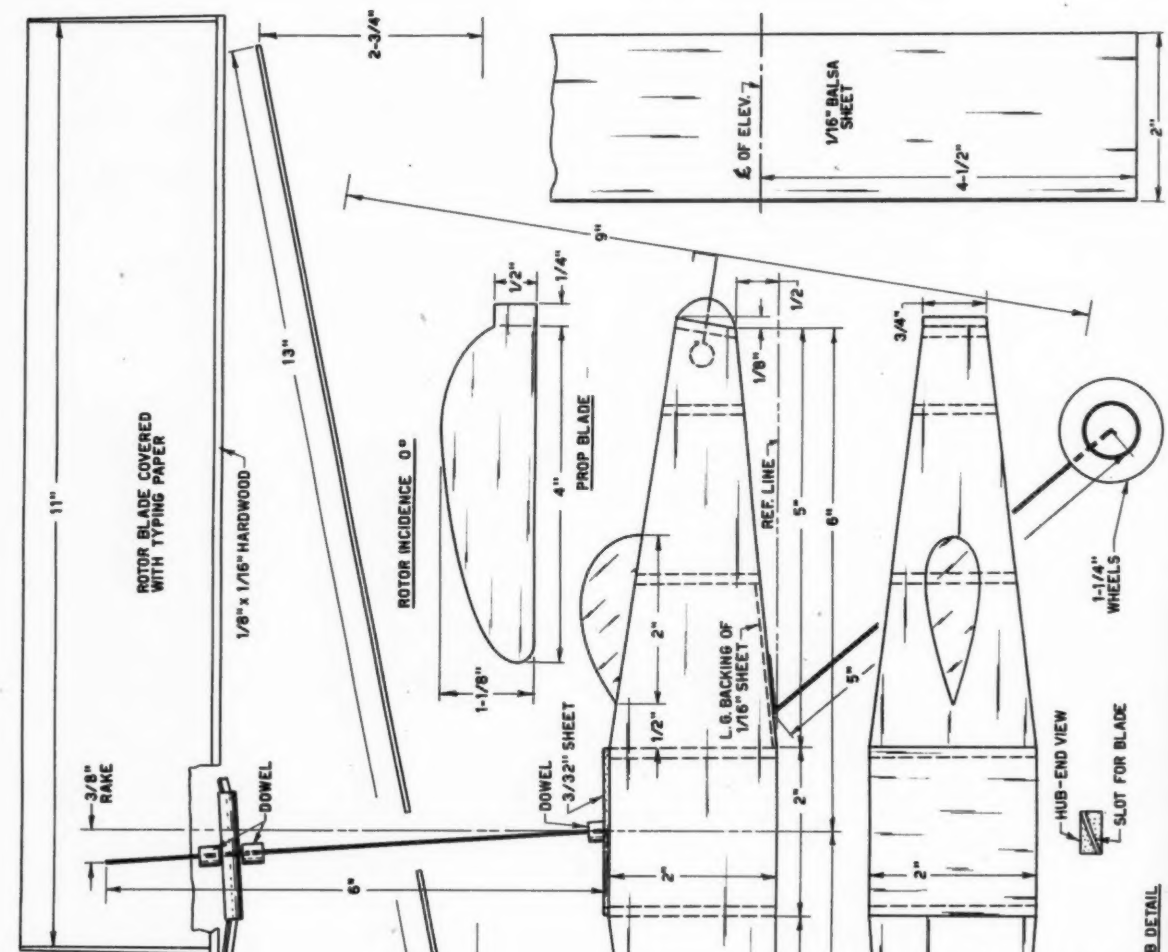
where W is the weight of the model, V is the speed in mph, and R is the line length in feet.

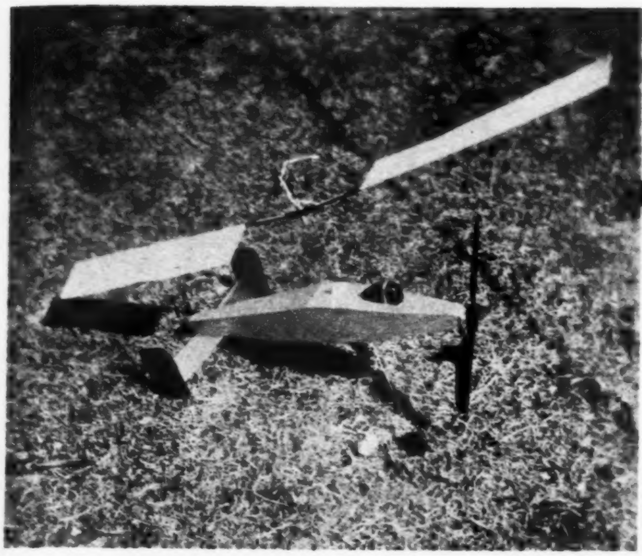
Values of the centrifugal force for a 1 lb. model weight are given in Fig. 3. Thus a 3 lb. model travelling at 150 mph on

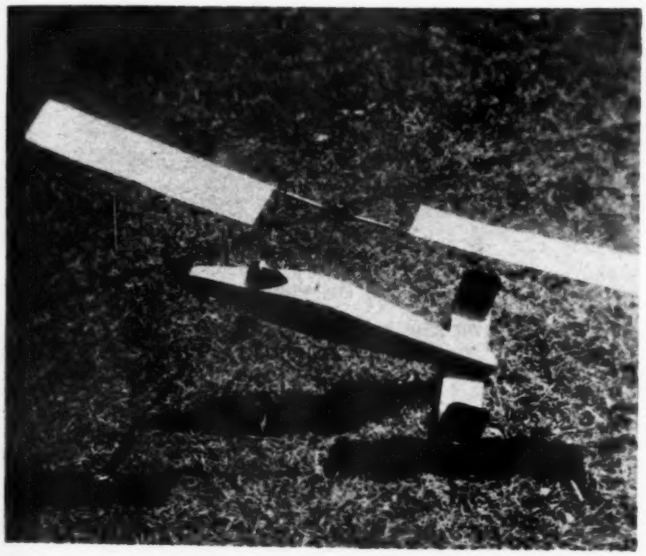
(Turn to page 66)






ROTOR BLADE COVERED WITH TYPING PAPER
1/8" x 1/16" HARDWOOD
11"
13"
2-3/4"
2-3/8"
3/8" RAKE
DOWEL
DOWEL
6"
ROTOR INCIDENCE 0°
PROP BLADE
1/2"
1/4"
4"
1-1/8"
1-1/2"
1-1/2"
ROTOR MAST AND LANDING GEAR FORMED AS SHOWN OF 1/20" M.W.
9"
£ OF ELEV.
1/16" BALSA SHEET
4-1/2"
2"
3/4"
1/2
1/8"
REF. LINE
5"
6"
L. G. BACKING OF 1/16" SHEET
5"
2"
DOWEL
3/32" SHEET
1/2"
2"
2"
2"
6"
9"
1/32" SHEET
ELEVATOR
RUDDER 1/16" BALSA SHEET 2 REQ'D.
3/4"
2"
3"
5/8
3/4"
1-1/4" WHEELS
HUB-END VIEW
SLOT FOR BLADE
1/2"
1"
PROP HUB DETAIL
0" 1" 2"
SCALE
TYPICAL PLUG DETAIL





A SURE FIRE AUTOGIRO

Autogiros are usually tricky, but this one is a sure fire performer

by ROY L. CLOUGH JR.

A DISTINCTLY rare item—the free flight model autogiro—has the reputation of being an extremely difficult thing to build and fly.

Demonstrating that this reputation is quite undeserved, this model is simple enough to be knocked out in an evening and is no more difficult to fly than a conventional ship. In fact, it is not even necessary to set the rotor in motion before launching. This model climbs at a steep angle and when power is exhausted floats gently back to earth on its spinning rotor, thus eliminating the chief cause of destruction of flying models—a head-on glide into a solid object.

Begin construction with the fuselage which is built up from 1/32" medium sheet balsa. Stiffeners are used at appropriate intervals and the thin covering is backed up with 1/16" sheet at the point where the landing gear is attached.

Nose and tail plug openings are reinforced with strips of 1/16" x 1/8" stock. The bubble canopy is carved from a block of soft balsa.

Tail surfaces are 1/16" sheet and are cemented in place with no offsets of any kind. Carve two end plugs; adapt one as a tail hook and the other as a thrust bearing for the propeller. The prop may be sanded down from a purchased pre-sawed blank or built up as was the original. The prop should be of medium low pitch, and diameter should not exceed 9 inches. Free-wheeling would be of no particular advantage in this model.

Bend the landing gear from 1/20" steel wire and cement it to the reinforced underside of the fuselage. Wheels are 1 1/4" in diameter and must be hardwood.

The rotor and rotor mast, while quite simple, must be made exactly according to plan to obtain optimum performance. The mast is bent from a length of 1/20" steel wire and is anchored to a plate of 3/32" hard balsa which is cemented to the top of the fuselage. A short length of drilled hardwood dowel is slipped over the mast and cemented to the plate for added strength.

The rotor is acted upon by highly complex forces in flight and must be highly flexible to permit these forces to be damped out without upsetting the model. The hub is a piece of dowel which is drilled to permit a loose fit on the mast. The spars are 1/16" x 1/8" hardwood, pushed into slots in the hub at the angle shown on the plan, and cemented. Two short pieces of 1/16" x 1/8" balsa are cemented to the upper sides of the spars next to the hub. Rotor ribs are simply toothpicks. Cover the blade sections with a strip of smooth typing paper, 2 3/8" x 11" for each side. Note that the rotor has 0 degrees incidence and will spin in the proper direction regardless of the direction from which the relative wind comes. *This is very important!*

Drill out two short pieces of dowel; slip one over the rotor mast, then put on the rotor, using the other bit of dowel to hold it in place. The proper height of the rotor above the fuselage is the shortest distance which will give good propeller clearance. The retainers are cemented in place after testing.

To test fly: install an 8 strand motor and balance the model at the rotor axis. Drop it from shoulder level a few times to make sure the rotor works well, then try short powered flights in calm air. The model should climb without deviating right or left and is performing best when it gains a foot of altitude for every foot of forward flight. Whatever minor adjustments may be required can be made by slightly bending the rotor mast.

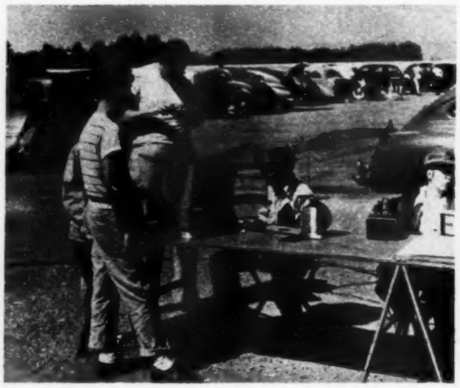
CLUB VIEWS

CLUB AND CONTEST ACTIVITY REACHED PEAK IN 1947 —PROOF IS SEEN IN THE PHOTOS ON THIS PAGE

M. J. Samuelson of Salt Lake City launches ship at 9th Annual Douglas Trophy Contests in same city

Fritz Probst Jr., Hi Point winner at contest of Jayhawk Sandusters in Lawrence, Kansas

Roy Badgley of Summit, N.J., and other members of Tri-County Sky Rovers check a motor



Processing is expedited at meet held by East Bay Aeroneers at Livermore, California

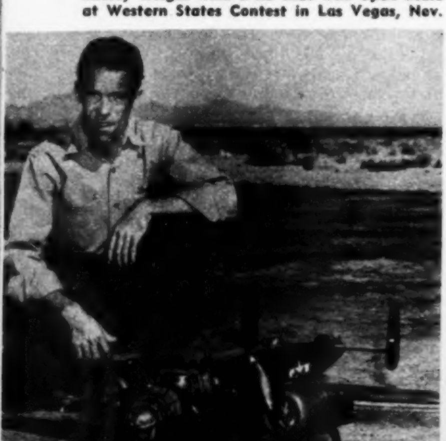
Members of Mayville (N.D.) Model Airplane Club with a control line assortment

A Nieuport scale job is worked over by members of Missouri Slope Model Airplane Ass'n

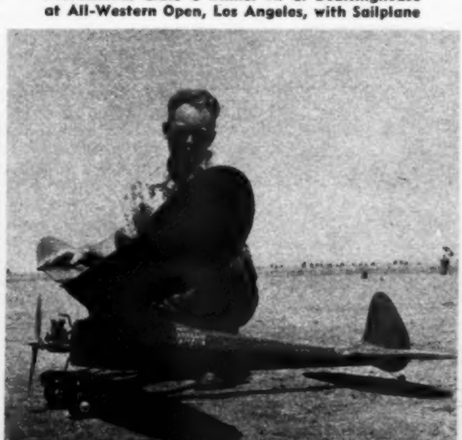
Smiling winners with trophies from Midwestern States Model Plane Championships at Indianapolis

Members of No. Indiana Gas Model Ass'n pictured during a model exhibition held in Gary

Shorty Wright with B-25 that won Open Scale at Western States Contest in Las Vegas, Nev.



Professional Class C winner A. C. Boultinghouse at All-Western Open, Los Angeles, with Sailplane



Bob Hagler launches a "B" job at 2d Annual Dixie Championship contest at Concord, N.C.

WEST COAST TIPS

by JOHNNY DAVIS

CONTEST, ah beautiful contest! And when we say it, we mean it. What Contest? The *Ontario Valley Skyhawks* Meet on November 30. The Director—Woody Woodward. The contestants—almost everybody in the Los Angeles and San Diego areas who could handle a control handle. Results—two new records that sang high in performance, besides which everybody, we mean *everybody*, had a good time.

It may sound repetitious, but Ed J. Sharp and Troy Burris, California's newest and now "hottest" racing team, took all three first places in Open Expert Speed. Last time it was Sharp and Newberger at San Diego.

Besides doing all this, the boys made a record run at the end of the meet and broke Keith Storey's Class V Open Speed record, turning 132.15 mph with Sharp's McCoy 49 all metal ship. That is really sizzling.

Keith Storey, not to be denied, bounced right back and lifted the Class III Open Speed record held by Les McBrayer at 120.80 mph, boosting the speed to 129.21 mph, an almost unbelievable speed for a .29 engine displ. class. Yet, for some time everybody has said that if Keith ever got a full run out of his little *McCoy 29 Golden Lancer*, he would do over 125, so at Ontario he did it. His secret—he changed gas tanks!

In Open Expert Precision, "Smoothie" Bob Palmer bested his team flying mate, J. C. Yates, in a star-studded stunt parade that included Jim Saftig of San Diego, Ed Lansberg of Hollywood, and many others.

Don Gulotta of Burbank made the highest number of points in precision, although he was entered in Senior Expert Precision, rounding out his day with a total of 326 points on the S.C. Congress rules. As a matter of fact Bob Palmer, expert that he is, only bested Bobby Brown of Hollywood by two points as he carded a 309 to Brown's 307. These youngsters (Gulotta 19 years old, and Bobby Brown 17) are regularly giving the more mature flyers a run for their money.

In the ladies' event Bunny Baldree won out over Beverly Sappington, when the Sappington pride and joy connected with old "terra firma."

Walter Jackman and his absolute scale *Navion* were a clean first place winner in flying scale. At one time, in days since departed (sigh), we used to fly around the Los Angeles area in this type ship representing Coastair, the factory dealer for *Navions* in the metropolitan area. We can assure you that it is a wonderful ship to fly, with no bad habits at all, and extremely comfortable on trips. Therefore, perhaps you can understand our feelings when we see such a perfect replica (even to the license number, which is one we flew). If Mr. Jackman ever misses his airplane, we wouldn't know anything about it, much.

Bob Palmer again was in there with his Lockheed *Sirius* or *Altair* (we can hardly tell them apart). He has retractable wheels and all sorts of gadgets on this beautiful ship, and has even simulated the rivets on the skin.

L. Hoffman's P-12-F was third—a finely detailed ship and an old favorite of ours. As far back as the old P-12-B we have always dreamed of flying a real Boeing P-12 but were never able to. Once, shortly after being commissioned in the Army Air Forces, we saw an old P-12-E sitting on an airdrome unguarded and started toward it, thinking here was our chance. But we turned away disappointed, because leaning on the fuselage was a sign reading: "Warning, for ground crew training only—not in flyable condition!" That was as close as we have ever gotten to flying one, but we always look with favor at this particular ship.

While on the subject of the scale model contests, this incident comes under the heading of "Now it can be told"—

During the recent running of the *Anaheim Balsa Butchers* meet last autumn, Ed Sharp was persuaded by friends to put his flying wing model "XPB-49 Boeing" (strictly fictitious title) in the scale event as a joke. After all, it was a beautifully finished ship and would fool some people who are

(Left) Some of the scale models entered in Ontario Valley Skyhawks meet. The tiny DC-3 is the pride and joy of speed pilot, Troy Burris, who flew them in the AAF

(Below) Here is a lineup of members from the Lakewood Model Assn., one of most active groups in Southern California

never quite sure what may be on an aircraft manufacturer's drawing board nowadays. So the "Boeing XPB-49" (etc.) was judged along with the rest of the scale ships. Imagine everybody's amusement when Ed's name was called for the third place trophy in flying scale won with his Experimental Boeing flying wing! To make it legal, you had better send the plans to Boeing quick like, Ed.

To get back to the Ontario meet, we won't want to state that it was an unqualified success.

So far as we can recall the only real disappointment of the day occurred when Johnny Churchill's *Dooling 61* Speed job, showing promise of fairly high speed, disintegrated in flight. Actually this is what happened: Johnny flew his ship earlier and had a small mishap which cracked the undersurface of his fuselage top. This didn't show, although at the same time he lost his engine cowl. But the next time he flew, the engine really leaned out and blooie! it was all over. The *Dooling* and the lower half of the ship went screaming off into the outfield and poor Johnny stood there with the handle in his hand. Tough luck, Johnny, but we know you will be in there pitching again soon.

One thing inaugurated by the *Skyhawks* Meet which met with unqualified approval was the breakdown of classification. These boys really went out of their way to see that everybody had a chance to win. You can believe this when we tell you that there were 52 first, second and third place trophies and prizes given away, not counting the merchandise awards which went to as many as ten places in some events.

This was accomplished by dividing the experts and amateurs into separate groups, as well as dividing them according to age. This style of contest is rather expensive from the meet director's viewpoint, but from the good feeling and happy atmosphere of the contest it seems quite worthwhile.

After talking to the experts, we feel sure they enjoy taking a crack at one another and don't particularly care about tromping on some new guy who happens to stick his neck out.

And speaking from the strictly amateur viewpoint (and wouldn't we know?), it's no fun to go out and know you are going to get beat before you start. So let's give Ontario, its *Valley Skyhawks* and Woody Woodward, its director, and all the members of his staff who worked so hard, a big hand. We will go back to another Ontario meet any time.

> EDITOR'S NOTE—We received a protest from Frank Greene, Secy.-Treas. of L.A.A.M., that our West Coast correspondent, Johnny Davis, was unjustified in his January column in which he claimed that the Oct. 5th Los Angeles Aero Modelers Meet was badly handled.
>
> We asked Davis to thoroughly investigate this complaint and his reply is contained in the ensuing paragraphs. We hope his explanation is satisfactory to all west coast enthusiasts, if not, MODEL AIRPLANE NEWS will make a further investigation in order to maintain its policy of fair play to all concerned.

WE have made a practice of calling our shots as we see them ever since we started out to plug the Coast in this column over two years ago. With pardonable pride we feel that during that time we have managed to make the Coast loom larger in national model thinking. We also feel that some "not well known" modelers would have had a little more difficult time in becoming as well known had they not had some one willing to sing their praises to the high winds. Not that they wouldn't have reached the top eventually, because champions can't be held back; but just that it would have taken a little longer.

However, we have not always liked what we have seen and have written about that, too. Sometimes we have been wrong, sometimes right. We always try to be right, but in this business who knows right from wrong *all* the time?

Anyway, to make a long story short, a few months back we roasted the *Los Angeles Aero Modelers* for a control line meet they threw. The following month we praised them to the high heavens for their free flight meet. In between the two issues, the wrath of the *Los Angeles Aero Modelers* descended on our Editor, putting Johnny Davis on the carpet and asking for his scalp.

It seems, according to their letters, that we had made a mistake in saying their control line contest was AMA sanctioned. They state it never had been considered for sanction. We said it had and we based our information on conversations with prominent *Los Angeles Aero Modelers* who, before the meet, said it *was sanctioned*.

One of these *Los Angeles Aero Modelers*, a high ranking officer, even resigned his position because of his disappointment at the way the meet was prepared and the lack of cooperation received, as well as the "oversight," as he put it, in not having AMA sanction. He definitely thought AMA sanction had been applied for, having urged the contest director to do so, weeks before.

Maybe it was, maybe it wasn't. The point is that some 18 or more clubs which now comprise the *Los Angeles Aero Modelers* thought we had taken a poke at them. Actually we had no such intention, mainly since we had no idea that all these various clubs, which we knew under different names, called themselves the *Los Angeles Aero Modelers*. This name we associated with the club which met at Echo Park and which is now defunct. The old *Los Angeles Aero Modelers* is now scattered through the wings, with leaders of the old club usually in responsible position in their own area club. We wanted to explain this for the benefit of the various clubs, such as the *Lakewood Model Club*, the *Bay Cities Modelers*, the *Thermal Thumbers* (whom we consider one of the top free flight clubs in the country) and others that we have no beef with you. Our beef is with something which to our surprise has vanished into thin air. So, this is just to set you straight.

With regards to the meet which you as a unit held on October 5, we have this to say. We have been told that you had a terrific list of entries that day—over 200, which for a control line meet that time of year is considered excellent. This means that you would normally have had over 450 flights that day. Now we didn't arrive until 9:30 a.m., and was there when the P.A. announced that the meet was sponsored by AMA and then retracted this statement a few minutes later. Shortly afterwards, Les McBrayer, Ed Sharp, Don Newberger, Keith Storey and others put away their hot ships and did not fly. Keith flew his Class VI job because he wanted some time on his engine, and *that* was *his* reason, as quoted to us. We noticed that the precision boys were still flying, although a good many cracked up due to the wind.

Just the same, compare the list of entries which you had with that of the Ontario meet. They were approximately the same in number, with Ontario having a few more, perhaps 10 or 15. Yet your contest was over at about 5:36 or 6, and the Ontario meet lasted until almost 10:30 that night, and at that most of the boys got only two flights, and not that many in a number of cases.

What we are driving at is: The modelers who entered your meet at Western and Rosecrans *mostly* understood that the Meet was to be AMA sponsored. When it was announced that it wasn't, there were growls, gripes, etc. Whether it was justified or not is not up to this column. We saw them leave and reported accordingly.

Now about the column which followed in which we praised your free flight meet. We meant every word we wrote, since it was by far the best run free flight meet of the

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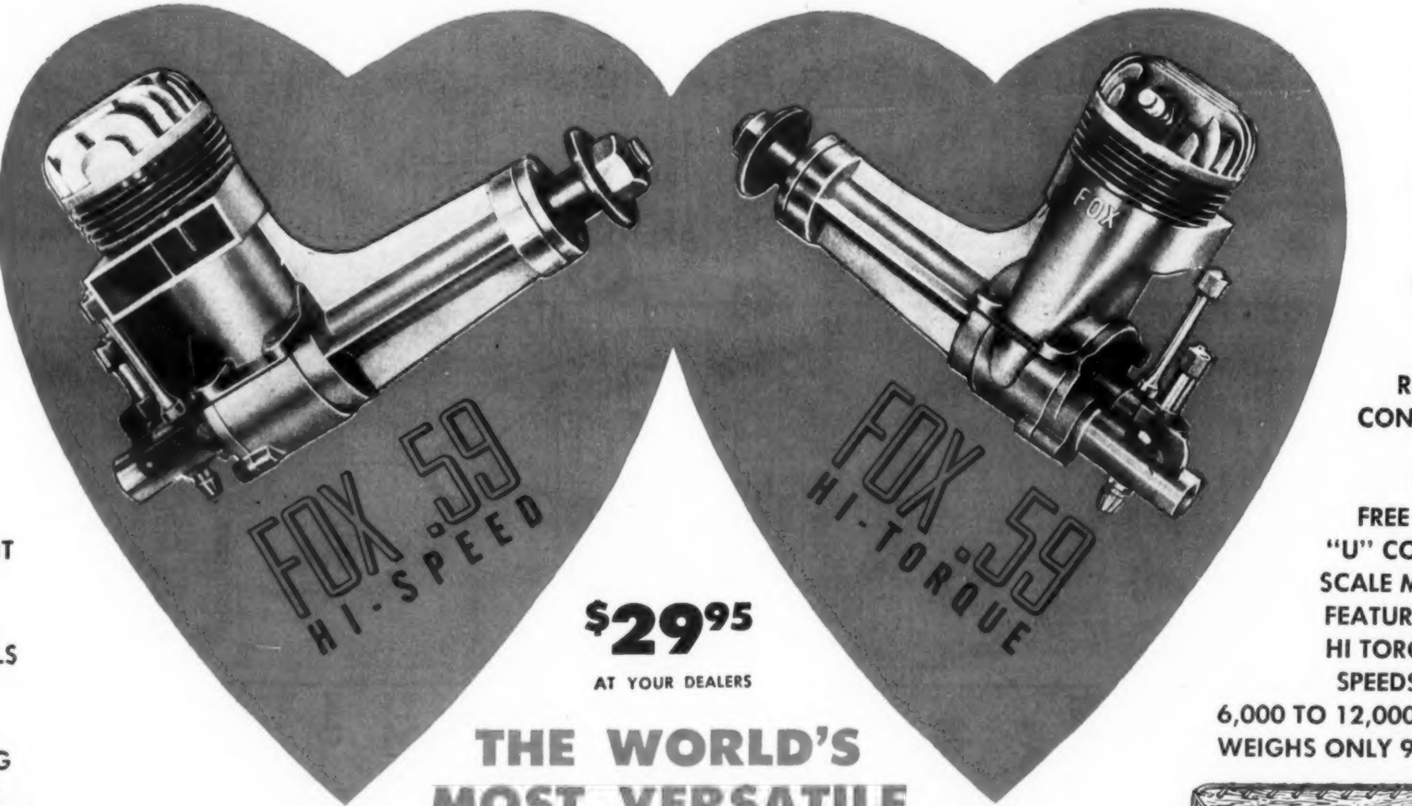

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FEATURING HI TORQUE AT SPEEDS FROM 6,000 TO 12,000 R.P.M.
WEIGHS ONLY 9½ OZ.

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LOS ANGELES 7, CALIFORNIA

year including the '47 Nationals (our apologies to the great Frank Nekimken). However, so far we have received not one thank-you for that "piece de resistance."

That's all, folks.

Results of the Valley Model Skyhawks of Ontario Contest—Nov. 30, 1947

Open Expert Class A

1. Ed. J. Sharp, McCoy....118.73
2. Les McBrayer, McCoy....115.23
3. Doe-Dunning, McCoy....104.04

Open Expert Class B

1. Ed. J. Sharp, McCoy....128.49
2. C. McDonald, McCoy....109.09
3. E. & J. Havlik, McCoy....105.57

Open Expert Class C

1. Ed. J. Sharp, Dooling....135.64
2. K. Storey, McCoy....133.43
3. J. McElroy, Dooling....129.68

Open Amateur Class A

1. R. Campbell, McCoy....110.29
2. T. Jentges, McCoy.... 96.20
3. C. Noyes, McCoy.... 89.15

Open Amateur Class B

1. R. Campbell, McCoy....111.38

Open Amateur Class C

1. E. French, Dooling....117.87
2. J. Taubold, Dooling....116.88
3. M. Axcell, Dooling....112.14

Senior Amateur Class A

1. B. Deemers, K&B.... 94.43
2. T. Pocock, K&B.... 92.35
3. Lew Mahieu, K&B.... 90.00

Senior Amateur Class B

1. J. Garcia, McCoy....111.38
2. J. Strawn, McCoy....103.35

Senior Amateur Class C

1. W. Lauderdale, McCoy....111.59
2. T. Pocock, McCoy....108.04
3. E. Morris, Dooling....107.97

Junior Amateur Class A

1. P. Conrad, K&B.... 82.64
2. J. Brodbeck, K&B.... 75.66

Junior Amateur Class B

1. R. Benskin, McCoy....110.42
2. B. Behrens, McCoy....108.23
3. A. Wadleigh, McCoy....100.05

Junior Amateur Class C

1. R. Benskin, McCoy....109.42

Open Expert Precision

1. B. Palmer....309 points
2. J. C. Yates....296 points
3. J. Saftig....271 points

Senior Expert Precision

1. D. Gulotta....326 points
2. B. Brown....307 points
3. B. Jamison....250 points

Jr. Expert Precision

1. J. Gilroy....243 points

Open Amateur Precision

1. G. Freymire....102 points

Senior Amateur Precision

1. D. Varner....285 points
2. D. Linderman....132 points
3. B. Vitale....119 points

Junior Amateur Precision

1. D. Miller....178 points
2. D. Page....163 points
3. B. McCaullom....146 points

Women's Event

1. B. Baldree.... 69 points
2. B. Sappington.... 19 points

Team Event

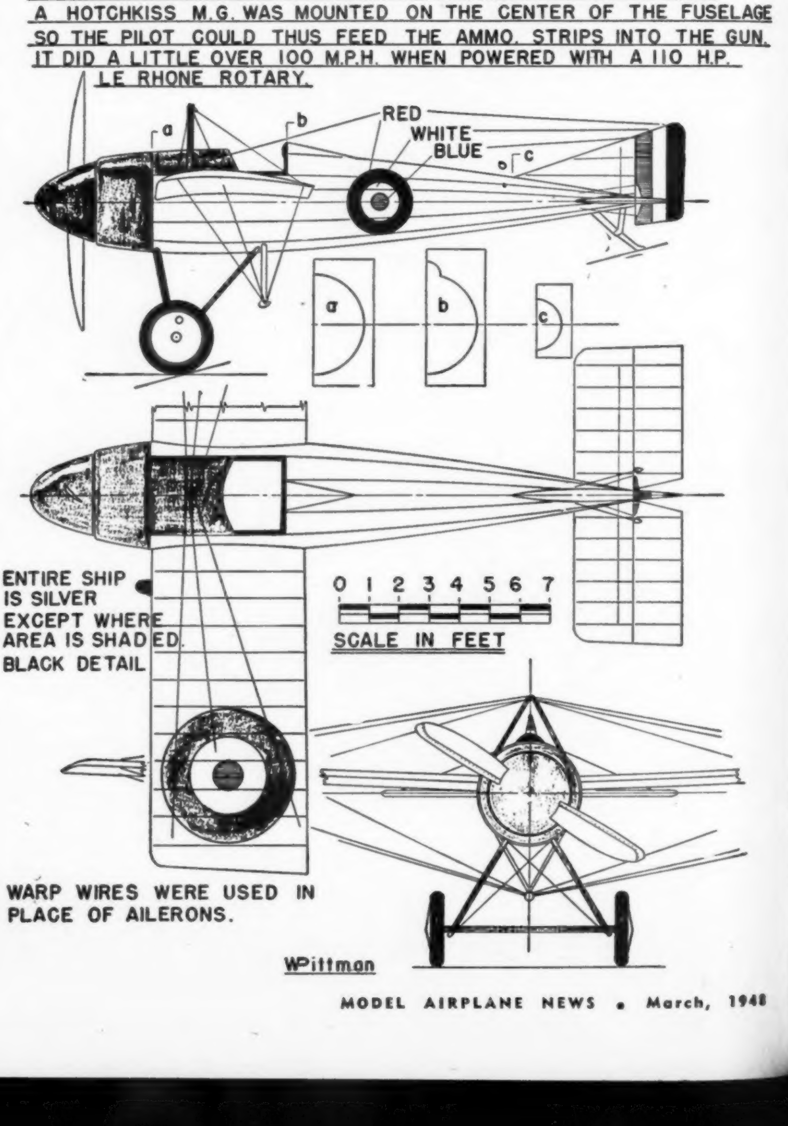
1. Yates & Palmer 2. Flying Tigers 3. McCallum & Page

Scale Event

1. W. Jackman....Navion
2. B. Palmer....Sirius
3. L. Hoffman....Boeing P12F

FRENCH MORANE MONOPLANE OF 1915

THIS TYPE OF PLANE WAS THE FIRST TO MOUNT A MACHINE GUN. A HOTCHKISS M.G. WAS MOUNTED ON THE CENTER OF THE FUSELAGE SO THE PILOT COULD THUS FEED THE AMMO. STRIPS INTO THE GUN. IT DID A LITTLE OVER 100 M.P.H. WHEN POWERED WITH A 110 H.P. LE RHONE ROTARY.



The Scrap Box

(*Continued from page 8*)

the site for the 1947 Nationals made the trip impossible for most northerners, travel being difficult for all the public. Next year there is no gas for autos!

"We are handicapped by lack of high-class gas model material, particularly U-control motors. No motors may be bought from the states, money not being allowed out of the country. Some folks would darn near trade their souls for a secondhand *Supercyke*, or similar motor. Prices of old motors which reach here by devious routes are sky-high, such as $51 for a 1939 *Ohlsson*, $38 for a 1942 *Forster 29*. A souped-up *McCoy* fetched over $75.

"Next season, note our free flight gas, rubber, and towline times, or flight ratios, and you'll have more respect for British modelers this time in 1948."

Henry Gilbert, a 54 year old British modeler who runs a combination clock, radio, electrical and model shop, offers further information on free flight in the British Isles. Though the old-guard denounces the "Goldberg pylon" Gilbert says: "I assure you that this type of model is now practically 100% built by the British lads for their power jobs. The Banshee (also manufactured in England—*Editor*) and similar jobs wiped the board in this year's competition. The Banshee with *Ohlsson* engine has been unbeatable. If you saw a British engine of similar capacity flying a powered job you were lucky. By far the most popular type of model built here now is the pylon of about 210-250 sq. in. This is usually powered by a Mills Diesel of 1.3 or 2 cc displacement. Anyone who has a secondhand .099 *Arden* is fortunate, for these fine little engines simply leave ours standing still. The way it starts on the second flip is an eyeful for us poor souls who manfully try to get our Diesels going in the alotted time of two minutes. (Gilbert refers to British Diesels—*Editor*.) We do not have a handicap of weight per square foot, and some of our lighter models weigh 9½ oz., including the 4½ oz. of a Mills."

But it took our old correspondent Bill Dean, who designs kits for the English firm of Keil-Kraft, to sum things up: "We decided two years ago," relates Bill, "that the American design trends are the thing and have introduced many designs that would go nicely in a MODEL AIRPLANE NEWS ad, certainly not belonging to the Maxwell Bassett era. The average modeler likes a pylon layout. Almost all the gas entries at the British Nationals were original pylon designs. We did a cheap easy-to-fly control-liner and now it is selling faster than any power kit done by the firm. Believe me, an evening with some of our hot modelers would soon convince you that there is not so much of a gulf between British and American modelers." Yes, these Englishmen talk our language!

* *

On the home front, the Christmas season got off to a bang-up start at the hobby shop run by Hank Cole and Chuck Hollinger. "We had a big blow-out at the shop the other night," said Hank. "A burglar set off a charge of explosives to blow out a window. I guess he was Christmas shopping." What did our model-conscious crook take? A race car and Hank's flying wing, the Arrowhead. Sounds like a California spy to us.

Free flight in the Seattle area, according to Cole, is in sorry shape. It is hard to believe that the nearest free flight field is a mere 50 miles away. Why that is worse than last year's Nationals! No wonder U-control, especially stunt, is picking up in the northwest. CO2, free flight, is barging right along. The last we heard, a speed contest had been scheduled over a 50 foot course.

The Seattle boys have, we think, the ideal answer to give out after a poor flight. This story ranks with the "one that got away" but, knowing Cole, it probably is true. Hank has a gas job that never did less than 3:30. After a 4:30 flight at the

Nationals his second attempt climbed high but came down rather quickly in 1:30. Other builders who launched their ships at the same time had a similar experience. Putting their heads together they came up with the verdict, "down draft." Cole watched his up- and down-drafts and got ten minutes out of sight on the last flight. So all you do is pronounce learnedly, "Ah, shucks, I launched it into a down-draft." We wonder now if spiral dives aren't due to reverse thermals. No better reason for spiral dives has been proved so far.

* *

Now that those new rules have been announced and the schemers are already hard at work on their 1948 models, some harsh words are being bandied about. Our personal opinion, for what it is worth, is that the changes were necessary but we don't think they went far enough on some points and may have gone too far on others. One common reason for the change was that any wing loading, as Joe Meckoll of the *Thermal Thumbers* aptly puts it, results in maximum power in a minimum ship, and hence a dangerous airplane. But the biggest reason was that sloppy processing had become one goshawful pain in the neck. We don't have to tell you that the new rules were not a unanimous agreement; many clubs offered strong opposition.

The powerful Indiana Gas Model Association went on record at the last minute with this statement: "Why do we oppose *any* rules changes? First of all, there will be a minimum of 125 models in our association alone that would be obsolete, not to mention the hundreds of models that would be obsoleted throughout Class C. This engine would be useless under such a power loading because of the wing dimensions involved. Picture hauling 7- and 8-ft. wings in your car, plus enlarged A and B ships, plus a friend, etc. AMA flight records are obsolete the year after they are established. We no more get one set of rules, develop new designs, when out come new rules."

This, gentlemen, has the makings of a real scrap. The Indiana Association, now taking steps to organize the area into the Indiana Congress of Model Airplane Clubs, drops the usual hasty hint that unless things change they may be forced to operate under their own rules. Specifically, what Indiana wants to see is an individual ballot giving all AMA members the opportunity of voting on suggested rules changes. At present the expense of this procedure is the only obstacle. AMA members now elect two contest board members from each of the eleven AMA districts, making 22 board members in all. These members contact all clubs in their district and each club supposedly registers its desires on the rules proposals, according to the vote of their own membership. Recently we made the suggestion to the Academy that such proposals be submitted to clubs direct from Washington rather than through board members. The very few cases where a thorough job might not have been done would be eliminated. Does club membership opinion reflect individual opinion? We know of one case where a Leader Member, Jack Moralez, went to the trouble of personally contacting well over 700 individuals in two districts and their opinions agreed closely with the club vote that determined the present new rules. A usually missed point is that an individual can make suggestions direct to the contest board in Washington. One such suggestion this year resulted in the rule that control teams must compete in the age group of the oldest member. This effectively stops oldsters from having their ships compete in Junior or Senior classes to swipe trophies or set records.

The Indiana group points up their case with the declaration, "We feel sure that the majority of AMA members and AMA chapters would be willing to help underwrite such added expenses." We invite the AMA to use this space in the next issue to give the low-down on the cost and problems of individual balloting, as opposed to the present system. This argument comes up every time the rules are changed, so let's drag the issue out in the open. What would it cost individual chapters? Would Leader Members and chapters back this play? One thing should be clearly understood. The AMA is *us* and not a group of Washington bureaucrats. We can vouch for the fact that boys in Washington do the best they can but have nothing but gray hairs to show for it. Threats of sectional insurrections can gain nothing but the collapse of everything we have built up over the years. Picture, for instance, each of the eleven districts operating under their own rules. The confusion would be as bad as crossing borders in Europe. Under any democratic vote, by clubs or by individuals, someone must lose. So let's talk it out, not slug it out.

* *

One thing that bothers us is the tendency of the hobby to get into a rut. Over the past five, maybe ten, years skill, design, contests, the very nature of our models have become more and more complex, leaving the beginner and the fun-flier out in the cold. Are we a vanishing race of experts? Are we so selfish that we can't see the woods for the trees? Old-timer Harry Copeland, vice president of the New York State Exchange Clubs, who has a perspective of years of leadership, seems to think so. "Apparently the older members in many model airplane clubs forget that they, too, were beginners," says Harry, "and progressed from free flight, gliders, rubber-power and gas, and in their clamor for control-line contests ignore new builders who can best learn the fundamentals of model flying with free flight models.

"In our Syracuse Model Airplane Club," he goes on, "we have a year-round contest scheduled which includes free flight indoor and outdoor; also control-line speed and stunt; but with particular emphasis on free flight for beginners."

The New York State Exchange Club program is principally directed toward encouraging new builders in the public schools. Each year registration has increased at annual statewide school meets. "Until such time as model airplane building is taught in our schools, the least we modelers can do is to provide leadership, guidance and encouragement to the youngsters in our respective communities who are eager to build and fly model planes. Is it too much to ask the oldsters to give the youngsters a break?" concludes Harry.

* *

Giving themselves a break which we heartily approve, the *Fresno Model Club* had a Chinese dinner for its members and showed a color film of its last annual free flight contest. "Boy, that was a meal with all the trimmings," states an unknown scribe, "and no fooling. There was plenty of Alka-Seltzer sold in the Fresno drug stores the next morning!" Some fun. The Fresno gang liked it will enough to plan Italian and Basque dinners. Wienie-roasting *Chicago Aeronuts* take note.

* *

The biggest New Year's guess concerns what is going to happen in free flight. Most people think models will be super performers. The 100 oz. loading is only what a lot of guys have been flying anyway. And now they can add area to their heart's content. Claude McCullough, whose farm compells him to divide his time between a tractor seat and the work bench—drat it—says confabs of the contest team out Ottumwa, Ioway, have decided that 8 oz. wing loading is the deal (he must mean per square foot), that dethermalizers will be used throughout all classes, and that reasonably deep fuselages in the interest of strength will be used in preference to sticks. "There'll be plenty of freaks at contest fields," thinks Mac, "but now rules will prove out pretty well."

* *

On the control-line side, we've heard little new since last month, except that that Boston record of 140 mph plus is official. Maybe that Seattle burglar will blow out a window in Boston now.

Air Ways

(*Continued from page 26*)

you would class 'definitely English' cleans up the kudos in contests. Such inconsistency appeals to our warped sense of fun!

"As for my comments on super speed and extreme designs in U-control, you answer yourself by more or less advocating an easing up on speed matters, and the introduction of more general-type contests. It will interest you to learn that control line contests are being introduced into the official contest calendar over here in 1948, and the S.M.A.E. have drafted a set of rules for such events based purely on stunting, speed being a non-contributory factor so far as points are concerned.

"But now—I in turn am hurt! I thought I had been able to convince you of our current difficulties in all matters aeromodelling, but it seems I failed. To disparagingly compare our 'pitifully small' turnout at a National meeting with the huge affairs staged in the States is hitting below the belt! Under present conditions in this country, any meeting held at one venue is bound to be handicapped owing to travel difficulties. A few—and here the word 'pitifully' can be well used—can afford the cash and, more important than that, the *time* to travel more than a short distance to a centralised contest.

"Any such meeting is bound to attract a majority attendance from the local club or clubs, and a very small band of ultra enthusiasts make up the balance from the rest of the country. We just have not the facilities or backing in this country to stage the high standard shows to which you are accustomed; but that this situation will improve when we have 'won the peace' I have no doubts. Trade sponsorship is naturally handicapped whilst the trade is in turn hamstrung by lack of supplies—short materials mean short sales, short profits, and therefore a reluctant decline in financial support.

"I can quite appreciate the reasons why our activities here in England seem so 'back in the sticks' to the average American—it's like a man with a full stomach trying to appreciate the feelings of a starving person! A recent article by Jim Noonan points out that engines in the States are plentiful and cheap, the average modeller owning more than one motor. Here we fight to get just one engine, and the vast majority will have to wait a very long time for the supply to catch up with demand. (Instance my own situation. The Authorities here will not allow me to bring in a selection of engines I ordered when in New York, even though these are scheduled for purely experimental purposes and not resale. After a paper fight of over eight months, the goods have just been turned around and sent back to America! I could weep!!)

"I won't bother at this stage to enter the arena on the merits of British as compared with American model design. I propose to wait until such time as we are able to meet in mutual competition on the flying field, when we shall see what we shall see. As a Britisher I think we can lick the pants off you in direct competition, but that may be wishful thinking! Unfortunately, in the past we have only met in one type of contest, i.e. the Wakefields, but it is my sincere wish that International events can be staged for the many other types of flying we are interested in.

"So here's to our next meeting, at such time as the personal and National exchequer will allow a repeat visit to New York and points west, and rest assured it will be during the busy flying season. It may be fun fighting through the subway and a snowstorm to witness a few speed wagons buzzing around the Kingsbridge Armoury, but I'm all for an extensive education into American modelling in the wide open spaces. (And am I looking forward to that promised third beefsteak in seven years!)"

* *

Picture No. 1 submitted by Ed Callahan,

(*Turn to page 40*)

518 E. 9 St., Chandler, Okla. shows John R. Hill, Jr. and John H. Dickson using the "twin handle" control hookup which they found to be a safe method of changing "pilots" while the plane is in the air. Using this hookup, an experienced flyer can coach a novice and at the same time be ready to take control of the ship during takeoff and landing, or in case of motor failure.

Howard H. Lundquist, 7227 Queen Ave. S., Minneapolis, Minn., contributed No. 2, a jet that he built in 8 hours to try out the motor. No attempt was made at refinement or streamlining; it was intended strictly as a testing platform so he could become familiar with the engine. The bellcrank and entire control system was hung on the underside of the wing and a tricycle gear put on to enable easy ground handling. It flew fast and easily from the start and to date has made 22 flights with only minor accidents due to pilot error and nerves. Best speed clocked was 111.4 mph. The first flights were a definite surprise as the pull on the lines was so slight even at speeds over 100 mph. The ship seems to follow the circle instead of heading out as do most control line planes.

Jose Caballero Navarro, Guarnidos, 7, Jerez de la Frontera (Spain) sent in No. 3 which he calls his "Scientific Good News." The ship is a free flight job powered by an *Ohlsson 23* with Trexler air wheels and an *Arden* timer.

No. 4 comes from T. Aoki, Fletcher, Ont., Canada. Mr. Aoki built this model from a kit sent to him by an English pen pal. The design is quite different from American models. The fuselage construction is different, as is the tail mounting. The plane flies well and is easy to repair, a feature which Mr. Aoki claims American models seem to lack.

Miss Betty D. Pike, a member of the *Wolverhampton Model Aeronautical Society*, is seen launching her first plane, a modified Ajax, in Picture No. 5. See "Club News" report for details on this English Meet.

No. 6 was submitted by Richard S. Snedeker, 363 Carlton Ave., Brooklyn 5, N. Y. This flying scale model is a P-40D built from Earl Stahl's plans in M.A.N. and has hit around 2 min. many times.

Glen Peterson, 1021 Yorkshire Pl., Dayton 9, Ohio contributed No. 7 which is his original conception of an "Ice Bug." The body was carved out of pine and had all recesses for motor, coil and batteries. An ignition switch extended from underneath to turn on ignition. Leads were brought out to runners and tail skid for purposes of attaching outside starter batteries, with the aid of battery clips. The motor used was an *Ohlsson 23* and made this little bug really skoot. The upper half of the body was fastened to the lower with dress snaps, and this made for easy accessibility as well as neat appearance because no visible fastening showed. The runners were made from the same type wire used for model airplane landing gear. The upper parts were forced into the block and lumps of solder served to make them more rigid. The upper parts of these holes were enlarged to allow for the solder which surrounded the wire, and just before the solder was about to set pressure was applied to the melted mass with a stick of wood which helped to imbed the solder in the hole. The tethering yoke was bent up from stiff wire and fastened to two screw eyes in the bottom half of the body. Trial and error found the best position for the tethering string. About 25 feet of cord

(*Turn to page* 42)

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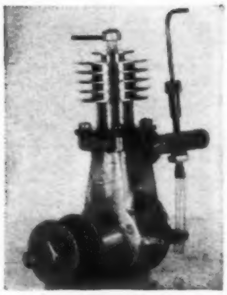

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Prop (Free Flight)	10 in.
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Running Position	Upright or inverted
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were used. With this type of runner it is difficult to run the model in a strong wind because before it gets up to speed there is some slipping across the ice and the wind can cause trouble.

Stan Staples, 461 E. Sacramento Ave., Chico, Calif., sent in No. 8 which is a 1" scale Taylorcraft BC-12-D, modeled down from a full scale Taylorcraft. The cabin is upholstered with rust colored cloth as in the prototype. All controls are present, instruments are built up from 22 cal. shell casings; general construction following that of the big ship. It spans 36" and is painted with a total of 20 coats of blue and cream dope with red pin stripe.

No. 9 comes from John Y. Bella, 1302 Cleveland N.W., Canton, Ohio. The builder of this beautiful Beechcraft control liner failed to send us any details, but as far as finish goes this picture speaks for itself.

R. A. Bierley, 1720 12th St., Portsmouth, Ohio sent in No. 10 of Hugh Byers, President of the *Portsmouth Model Club*, with several of his excellent flying control line jobs.

James Poux, The Plateau, Meadville, Pa., submitted No. 11 which he built from plans in M.A.N. The "Ay Jay" is covered with orange Silkspan. Due to the fact that the motor used was old, no outstanding times have been turned in. Mr. Poux is a member of the *Meadville Keystone Flyers*.

No. 12 was sent in by J. Warren Kohler, 34-28 Corporal Kennedy St., Bayside, L.I., N.Y. This asymmetrical design class I control speed job is made of all-balsa construction with only the boom and vertical tail of metal. The boom is brass tubing and the tail is sheet tin soldered to it. The ignition is very compact and the gas tank is tailored to a close fit in between and under the batteries which are pen cells.

NEWS OF MODELERS

Brian G. Hewitt, aged 25, 52 Woodland Road, Northfield, Birmingham 31, England, is anxious to correspond with an American who can give him some information on Stunt control line flying.

Al March, 128 Market St., Aurora, Ind. would like to correspond with modelers aged 14-17, especially those who build rubber or gas models.

Eric C. J. Martin, 1 Stanhope Terrace, Bayswater, London W. 2, England is interested in exchanging copies of the "Aeromodeller" for "Model Airplane News."

D. A. Brookbank, 19, Collington Ave., Benhill-on-Sea, Sussex, England feels that first hand information on American aeromodelling, particularly U Control, is essential for the progress of English aeromodelling and desires to exchange magazines and letters on this subject with an American boy.

D. Franklin, "Wendy," Norsey View Drive, Billericay, Essex, England is interested in the new CO-2 engines and would appreciate exchanging plans, sketches etc. of them with a boy around 18 yrs. old.

Edward Soltis, 57 Morningside Ave., Yonkers 3, N.Y., member of the *Yonkers Gas Birds*, is eager to correspond with a model builder. We have seen some of Mr. Soltis' work and it appears to be first rate. The fact that he is deaf does not limit his ability as a craftsman.

Alan Indge, 15 Oaklands Ave., West Wickham, Kent, England is a U Control and free flight gas enthusiast who would like to correspond with an American of

about 21 yrs. with a view of exchanging a little merchandise and magazines.

L. Hobbs, 57 Boundfield Road, Catford, London, S.E. 6, England would like to contact an American (around 21 yrs.) interested in either model building or motorcycling.

CLUB NEWS

California

The Vallejo 4th Model Meet sponsored by Vallejo Exchange Club and *Vallejo Sky Jockeys* was held November 2 at the local High School. Ralph Stillings, contest director deserves credit for a very well run contest. Results:

Junior Precision

Class A—1. E. Styles 2. Fresham 3. D. Holdfelder
Class B—1. D. Holdfelder 2. Don Butman 3. Bill Thundberg
Class C—1. Clarence Tyer 2. Don Butman 3. B. Thundberg

Senior Precision

Class A—1. Ray Regalia 2. W. Biscay 3. Bud Craighead
Class B—1. R. Arista 2. C. Bussard 3. Carrier
Class C—1. C. Bussard 2. Ray Regalia 3. Ed Kroll

Junior Speed

Class A—1. Lee Lutz 2. Brown 3. Mallory
Class B—1. Gosh 2. C. Hallum 3. Brown
Class C—1. Les Douglas 2. Mallory 3. Powell

Senior Speed

Class A—1. Jerry Guggemos 2. Ray Spinelli 3. B. Richards
Class B—1. B. Richards 2. Nelson 3. Jerry Guggemos
Class C—1. Eric Moline 2. C. Matthews 3. Forrest

Team

1. Bussard and Kroll 2. Butman and Bradford

Women's Event

1. Barbara Santina

* *

Los Angeles Aero Modelers held their 23rd Semi-Annual Free Flight Contest November 9 with 203 entries. The results:

Class A—1. Jack Strehlow 2. L. J. Boyer 3. Duane Wilson
Class B—1. W. T. Turner 2. Rodger Jensen 3. Milton Tonney
Class C—1. Martin Smith 2. Frank Davis 3. Art Swift
Juniors—1. Jason Hayward 2. Bruce Strehlow 3. Eugene Wallock
Sweepstakes—1. Bill Turner
Longest Flight Trophy—1. Rodger Jensen
Novice Trophy—1. Bill Turner

* *

Winners of the *Fresno Gas Model Airplane Club* Free Flight contest Oct. 26 are:

Class A—1. Ed Miller 2. Ronald Mosier 3. Tom Jenkins
Class B—1. Dutch Van Tassell 2. Bob Hay 3. Henry Vincent
Class C—1. Al. Bissonnette 2. Dean Hughes 3. Norman Peterson
Juniors—1. Norman Peterson 2. Thomas Diel 3. Ronald Mosier

* *

Aero Spooks of Visalia held a U-Control Meet Dec. 7 at Recreation Park. No results received as yet.

* *

The San Francisco Recreation Department of the Junior Museum sponsored a contest for Class A models on Dec. 22, conducted by the *Pterodactyls.*

* *

A new U-Control club recently formed in Alameda is known as the *Alameda Model Engineers.* They have 13 members and are busy with a membership drive. The AME's fly at their own field on the corner of Union and Eagle Sts., and at the City field on Bayfram Island. Meetings are held every 1st and 3rd Thursday at the McKinley Park rec room at 7:30 p.m. Officers are: Robert Stanley, Pres.; George Haberman, Vice Pres.; Tom Harper, Sec'y.-Treas. Initiation fee is $3.00 which includes insurance. Dues are 50c per month for Seniors, 25c per for Juniors.

* *

The *San Francisco Mustangs* and *South San Francisco U Liners* united

their efforts towards giving a U-Control Contest at South San Francisco Ball Park on Jan. 4.

* *

The *Chico Hornets* U-Control Club now have a membership of 21 and are getting bigger every day. The club has facilities at the Chico Airport which consists of clubrooms, workshop and flight circles. Art Langois is club president and B. L. Brooks, secretary. Headquarters for the club is at Brooks' Hobby Shop, 124 Main St., in Chico.

Colorado

L. C. Foiles wrote us that the *Rocky Mountain Canaries* model airplane club is putting on a training program for beginners to learn control line flying. This program has increased club membership and sponsors 100%.

Florida

The *Pensacola Prop Twisters* held a meeting and elected the following officers for 1948: Chet Farrage, Pres.; I. J. Wright, Vice-Pres.; Jimmie Green, Sec'y; L. E. Wortenbe, Treas.

Illinois

The *Gas Bugs* of Rockford elected the following officers for 1948: Nat Bast, Pres.; Hugo Anderson, Sec'y.; Harry Clay, Treas.; Art Hudson, Publicity Manager. Mr. Hudson would appreciate hearing from other clubs in the midwest regarding their winter activities and future contests. His address is 609½ Kilburn Ave., Rockford.

Maryland

A new club has been organized in Aberdeen and is being sponsored by a Hobby Shop. The club is as yet unnamed and the members are active in everything from CO-2 jet racers to stunt, scale and speed models. The members are interested in corresponding with a leading club such as the *Chicago Aeronuts*. Mail may be sent to Victor Hurwitz, 34 Liberty St., Aberdeen.

Massachusetts

Lawrence Gas Model Club is going to hold its second annual dinner meeting on Feb. 23. Plans are also underway for an invitation meet next spring. Newly elected officers are: Edmund Chulada, Pres.; Phillip Johnson, Vice Pres.; William Busta, Treas.; Eileen Johnson, Sec'y.; Herbert Brown, Publicity Director; Walter Leonhardt, Historian.

Michigan

The *Detroit Balsa Bugs* held a stunt contest Nov. 16 with these results: 1. Joe Anthony; 2. Benny Howell; 3. Webb; 4. Warren Jones; 5. Gene Treuter. At the semi-annual election of officers the following were chosen: Bud Kagel, Pres.; Burton Jones, Vice-Pres.; Ted Groat, Sec'y.-Treas.

Nevada

The *Sagehoppers Model Club* in Reno meets every 2nd and 4th Monday at the Reno Recreation Center, 303 S. Center St. The club has been active since last June and at present has 26 active members who have different interests: U-Control, freeflight, rubber power and solid models. For further information regarding this club write to Jack LaRue, 1615 E. Sunset Drive, Reno.

New Jersey

The *Jersey Model Club* held a U-Control contest Nov. 11 at 20th Century Field for Club members only. Winners: 1.

Peter Katstra; 2. Vincent Sabatina; 3. John Karal; 4. William Johnson; 5. Jack Franke.

* *

Bill Paterson recently wrote us some good news about the *Vineland Aeronauts.* The club was recently given permission to use a plot of land large enough for 5 control circles and plenty of parking space. Although it is not quite large enough for their annual invitation contest, they are planning inter-club meets between *Bridgeton Whirlwinds* and a couple of the Atlantic City organizations. The city of Bridgeton also donated to their club a plot approximately the same size. Newly elected officers of the *Aeronauts* are: Anthony Cardarel, Pres.; Bill Hollenbach, Vice-Pres.; Richard Hunt, Sec'y.-Treas.; Andy Canino, Club Director; Bill Paterson, Ass't. Club Director.

New York

Long Island Model Flyers of Oceanside will hold their 2nd annual open U-Control contest at the Freeport Municipal Stadium, Freeport on June 20; rain date June 27.

* *

The *Prop Spinners* recently announced that a special contest is to be held May 2. The field is tentatively set as Curtis Airport, Valley Stream, L.I., and events are to be radio control and free flight payload. Entry blanks will be distributed soon; all entries must be sent in to the club one month in advance of contest date.

The club has initiated a series of free flight "get-togethers" which are being held on the 2nd Sunday of each month until November 1948. Originally scheduled for Creedmore field they are now being run at the above mentioned Curtis Airport. All are being sanctioned by the A.M.A. and all modelers are cordially invited to attend. Two of these "get-togethers" have been held so far: The first at Creedmore on Nov. 16, and the second at Curtis on Dec. 14. Results are:

Nov. 16—Combined classes of gas models—1. Ken Fisher, 2. Art Horak. Hand launched glider—1. Bill Fletcher

Dec. 14—Combined classes of gas models—1. Ken Fisher 2. Tom Sanial 3. Basil Giessen. Hand launched glider—1. Pfc. Warren Fletcher 2. Mr. Menchani 3. Frank Altomari

Pennsylvania

The *Knights of St. George* held their First Annual Gas Model Plane Meet on Nov. 16 at Kirby Park, Wilkes-Barre. Here are the results:

Speed

Class 1—1. Matthew Gillis
Class 2—1. Jack Weaver and Neil Powell 2. Oscar Kovalesky 3. Matthew Gillis
Class 3—1. Lynn Phillips 2. Matthew Gillis
Class 4—1. Charles Bauers 2. David Yencha

Stunt

1. Kenneth Fox 2. Ralph Daley 3. M. Poley 4. J. Sampson

Beauty

1. Sonny Evans 2. Angelo Campanello 3. Don Brandt

The Bucks County Federation of Model Clubs came into being with three members. The organizers of this new and upcoming federation are: Kiwanis Aero Club of Doylestown; New Hope Model Club, New Hope; and Bristol Modeleers of Bristol.

Canada

The Canadian Nationals ran off well and some good days of flying were had. The U Control at Varsity Stadium, Toronto, was swept by Harold DeBolt, but the Canucks were in there pitching. Friend Russ Tombs topped 100 with his *Forster 29* speed buggy, which isn't coasting in anybody's language. DeBolt took this class, though, with a spectacular 118 mph. He used an R. B. Special in a modi-

fication of his Dmeco Junior. Harold also took stunt, "A", "C", and "D" speed. In "C" Class speed, Gord Hockin had a hot ship but bad luck dogged him and he didn't receive a clocking when his crate was at its best. Leo Wagner of Buffalo tried to catch DeBolt with an *Arden* Dmeco Junior, but missed by several mph. Duke Wallacher and Jim Belote of Ann Arbor, Mich., did fairly well as runners-up. A chap named Hawkshaw from Ajax, Ont., gave a demonstration of a Dynajet running, but bumpy ground didn't permit the crate to get off. In stunt, Hawkshaw put on a spectacular display in the afternoon but declined to have his ship judged until evening. Came evening, and the *Super-Cyke* powerplant failed to kick properly. Otherwise, we think Hawkshaw may have beaten DeBolt who was flying his "Super Bipe", powered by an experimental Drone "49". This latter ship was no slouch in the air —but we couldn't see it very well. Seems the smoke from DeBolt's pipe pretty well obscured the field. (These notes from Burdin's *Hobby Highlights.*)

England

A communication from the *Wolverhampton Model Aeronautical Society* informs us of the election of the following officers: Mick Smith, Chairman; S. Ward, Sec'y.; W. R. Ormerod, Treas.; G. M. F. Hemsworth, Press Sec'y.; Betty D. Pike, Records Sec'y. A contest held May 11 produced the following winners:

Glider—1. E. Thompson 2. W. A. Griffiths 3. D. V. Bate

Open Rubber—1. E. Hickman 2. Mick Smith 3. T. Guy

Radio Control Can Be Simple

(*Continued from page* 13)

of batteries lasted for the entire summer without being replaced. We prefer the plug-in type battery for its convenience and the fact that it does not require a battery box. Plug-in batteries are available in the above sizes from the hearing-aid dealers.

The batteries listed are an "average" set and will give about 20 hours flying time. Smaller batteries may be used but will have less life. If your plane can carry a little extra weight it is wise to use the extra load in batteries. The batteries are held securely against a bulkhead with rubberbands, which are really tight to prevent their slipping.

The receiver is shown in Fig. 3. It is a superregenerative type using one miniature tube on the 50-54 Megacycle Amateur Radio Band. Its sensitivity has been well demonstrated in flight as well as its ability to operate over a wide range of battery voltage. The "B" voltage can be varied from 45 down to 35 volts, and the "A" voltage from 1.5 to 1.1 volts, which means longer battery life and less frequent replacements. The receiver is suspended between two stretched rubberbands which serve to isolate it from motor vibration and hard landing shock.

The escapement device in the photograph is mounted in the fin of this model. It is driven by the wound rubberband whose energy is released by the electromagnet. The pin on the spoked wheel engages a slotted arm from the rudder flap and thus positions the flap. There are three main flap positions—right, left, and neutral; and two intermediate positions—half-right and half-left. The fact that the rudder must follow a definite sequence has been found not a severe handicap because of the inherent high

(*Continued on page* 49)

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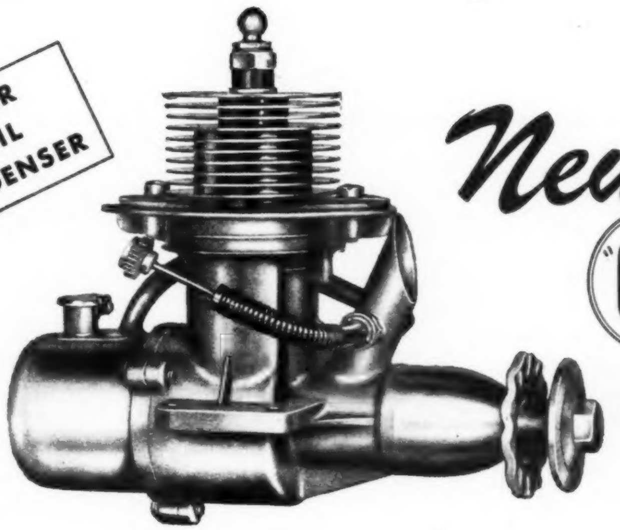

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LESS GLOW PLUG

BUILT TO TAKE THE STRESSES PECULIAR TO A PRE-IGNITION ENGINE

"O.K." again demonstrates its leadership by being first to introduce a class B engine expressly designed for Glow Plug operation. This newest addition to the famous "O.K." family is not a conversion model but a completely new design.

While the "O.K." Hot-Head brings new simplicity to the miniature engine field, its pre-ignition firing subjects the crankshaft and bearing surfaces to unusual stresses. To counteract them, the Hot-Head has an extra heavy crankshaft .406" in diameter, a drop forged, heat-treated connecting rod and a bronze main bearing 1-5/8" long. This oversized bearing presents a greater area to withstand heavy impact loads and stresses. The result is a balanced engine that will give long life and high efficiency.

Don't take the chance of ruining your present conventional ignition type engine by conversion as the average engine of this type will not perform satisfactorily nor is it built strong enough for Glow Plug operation.

The "O.K." Hot-Head is so simple to operate that all you do is connect a 1½ volt battery to the Glow Plug until the engine starts. The battery is then disconnected immediately and the engine will continue to run on pre-ignition firing.

The "O.K." Hot-Head operates on special fuel as indicated on the instruction sheet with every engine. The Glow Plug can be purchased at your favorite hobby shop for 85c.

SPECIFICATIONS

Displacement — .299, B class. Bore — .760. Stroke — .660. R.P.M. — to 11,000. Weight with fuel tank, 7 ozs.

BUILT TO TAKE IT

HERKIMER Tool and Model Works, Inc., Herkimer, N.Y.
CANADA: Herkimer "OK" Engine Co., 511 Hermant Bldg., Toronto
EXPORT: 120 Wall St., New York 5 (All Cables) Concordia, N. Y.

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speed of the system. For instance, the rudder can go from full-left to full-right in 1/10 second! An 8 in. loop of rubber provides more turns than required for several ten minute flights. When installing the escapement it is important to be sure that all parts are "free" and that no binding occurs.

At the 1947 Nationals an engine cut-off device was used in addition to the rudder control to garner extra points. It added less than one ounce of weight and allowed stoppage of the motor at any time. Use of the thermal delay principle accounts for its simplicity. Four connections are made to the cut-off switch as shown in Fig. 2. Two of the connections take the same voltage as the escapement and lead to a heater element inside the delay switch. The other two are in series with the engine ignition circuit and lead to a pair of normally closed contacts inside the switch.

The contacts are mounted on heat-sensitive bimetal arms. Thus, energizing the heater for three seconds, or longer, causes the contacts to separate, opening the ignition circuit and the engine stops. In flight it is only necessary to hold the transmitter "on" (half-rudder position) for over three seconds to stop the motor. A safety advantage appears here in that if an interfering transmitter should "jam" your frequency, the motor will cut after three seconds and the model will glide down in a large safe circle rather than climb off into the distant blue.

Well, that is all that goes in the ship; receiver, escapement and batteries. A switch and a little wiring finishes the installation. The wiring between units is accomplished with a good grade of insulated *flexible* wire. Never, never use solid connecting wire unless you also want to "sweat out" as we did, a flight in which a broken but touching solid wire intermittently allowed operation. Luckily, the plane was landed back on the edge of a 600 acre field! Do a really good job of installation if you want reliable results. A poorly soldered joint or half-broken wire will soon catch up with you—after the ship is in the air. The above describes the airborne gear. What about the ground equipment?

It should be heartening to know that transmitter equipment has greatly improved since the war. Field experiments have shown that low-power transmitters are quite effective. Fig. 4 is a Schematic Diagram of the transmitter. Its self-contained batteries give four watts input to the miniature push-pull oscillator. Using the transmitter as a base, it supports the antenna pole which quickly slips in place, so but a few seconds are required at the field to put the transmitter in operation. A control switch at the end of a 7 ft. cable completes the ground equipment. This simplicity is a far cry from the old days which required storage batteries, high voltage genemotors, and many long minutes of "set-up" time.

Probably the best insurance for consistent successful radio flights is careful pre-flight testing at home. Tests in the workshop, then out on the ground and with the motor running are all worthwhile. In fact, every test you can think of, short of actual flight, should be tried at home close to your tools and hot soldering iron. This may be equivalent to suggesting that a new gas modeler run his engine before appearing at the field for expectant flights, and we all know what happens to those who don't.

Don't be discouraged by a few unsuccessful "shake-down" flights. It always

seems to take a few of these at the start of the season to get everything tied down. Once they are out of the way you are ready for some real controlling. We have found that 10 to 20 flights are required to give the operator a good "feel" for the control. This apparently sharpens his judgment of the model's flight characteristics and also "educates" his timing.

After arriving at the field, the transmitting antenna is connected to the transmitter and the plane is assembled. Everything is ready for a flight except for a few routine checks. If the equipment has not been operated for some time, the battery voltages are checked and perhaps a distance check is made to adjust the transmitter tuning. If these tests have been made recently, then it is just a matter of turning on the transmitter and testing for satisfactory control. This is done before the motor is started. Now the motor is started and *one final check is made*. This check is *never* omitted any more! It consists of running the rudder through several positions just before takeoff. If *perfect* operation does not result, the plane is not launched. On several occasions imperfect operation was ignored, hoping it would "work all right" in the air—it didn't!

To avoid any misunderstanding between the person launching the plane and the operator at the transmitter, it is well to adopt a standard test procedure. One that has worked out well in practice is to set the rudder, by radio, to right rudder just before the motor is started. After the motor is running satisfactorily the launcher raises his hand and watches the rudder. Then the radio man sends three dots or moves the control key to cause the rudder to go to "neutral," then "left," then back to "neutral." This leaves the rudder in "neutral" with the next position "right" rudder, which is the most likely needed control position if there is any trouble on takeoff. If the rudder goes faithfully through these three positions the plane is launched. This is done either by hand, by running a wingtip, or by unassisted R.O.G. after a little flying experience has been gained. The plane is allowed to climb to a height of 40 ft. or more before any control is given—just another safety measure—a radio controlled plane is not of much use if it consists of a pile of sticks at your feet!

If the plane has been trimmed for a smooth climb and glide and the right and left circles are about the same size, then it is time to consider doing some fancy maneuvers! The maneuvers to be listed and described are a few of those that can be done and *have* been done with *rudder control alone*. This is to point out that it is possible to perform a large number of stunts or maneuvers with a small amount of equipment and a simple radio control system.

The following descriptions by no means imply that this is the only way in which these stunts can be done; however, they are the result of actually doing them with the particular plane we have been flying.

First, an approximation can be made to a three point landing by keeping the plane in a full-right or left turn while it is losing its last 10 to 15 ft. of altitude. The plane in Fig. 5 is in its gliding turn, the motor is off. When the ship has about two feet of altitude left, it is suddenly brought out of the turn by quickly applying opposite rudder and then neutral. The effect is to give an extremely flat glide due to the excess speed picked up in the turn. If properly executed the ship will make a beautiful landing with hardly

a bounce. Needless to say, a calm day is preferred and the over-controlling must be carefully done to provide a fast but smooth "straightening out." The same effect may be had by merely neutralizing out of the main turn, but the flattening effect is not so pronounced and the control may not "take" sufficiently fast to make a good landing. When the over-control technique is used, it is best to neutralize the controls just at the instant that the ship noticeably "takes" the opposite rudder control. Thus, by the time the plane responds to the neutral position it will be well straightened out. It is the time of response of the plane to the controlled surface that has to be considered, as the motion of the control surface is practically instantaneous with this system.

The next three maneuvers: the spiral dive, the stall, and the loop, are all based on the correct performance of the spiral dive, so it will be described first. See Fig. 6. It is well to have plenty of altitude for this stunt, just in case the "earth-bound pilot" gets a little nervous and does not pull it out fast enough. 500 to 1000 ft. should suffice, and the ship should be upwind and a little off to one side so that the "pilot" can get a good perspective of what is going on. The ship should be given either "right" or "left" rudder, whichever produces the tighter circle. If they are both the same, give it "left" rudder and *wait!* The motor should be running good and fast. The first circle will be a standard 360° turn, and maybe part of the second circle will be too, but watch the bank—it's getting steeper and the nose is starting to drop. The motor is "reving" up now that the plane is flying faster, and by the time that third or fourth circle occurs the ship is heading almost straight down and making the most beautiful spiral dive you have ever seen! What if the radio doesn't work? It just can't quit now! Give it neutral rudder and see what happens. There, it is straightening out and even gaining altitude from its excess speed.

Now that we're back on the ground let's gas it up and try for another spiral, this time ending up with a stall, as in Fig. 7. A little altitude, please! There's "left" rudder—one circle—two circles—she's banking pretty steep—three circles—the motor is screaming now—four circles—quick, give it opposite rudder, then neutralize. Did you see that ship straighten out? There goes the nose, up, up, up. Oh, now she's falling out of the stall! Not bad though, even if it does leave you kind of weak!

How's your constitution? Is that wing fastened on real tight? Let's try the loop! See Fig. 8. Did the ship really come down fast on that last spiral, or do you think it could have gone a little faster? It will need every ounce of speed it can get if it's going to go on over into a loop, because you are going to operate the controls exactly as you did for the stall. Let's put in a little down trim on that elevator just to speed things up a bit. Also, let's have a good thousand feet on this trip. Now, give it "left" rudder again and wait—wait until you just don't dare wait any longer—five circles—six circles—it's coming down faster this time—quick, opposite rudder — neutralize — there she goes, up, up, up—she's over! Boy, what a sight! Give a little right rudder just before she hits the bottom of the loop, that will pull her around and keep her from stalling out. Now, neutralize after the turn is well established and let her work off this excess speed in a gradual manner. Ready to try it again or do you need smelling salts first!

Baby SE5

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Incidentally, glue in tubes is ideal for this work; by properly regulating pressure on the tube as you draw the nozzle over the edge of the wood, a perfect bead of cement can be put on even the thinnest edge. Of course, when you bring the bottom piece up against the lower edges of the sides to which you have thus applied glue, the latter will be squeezed both inside and outside the joint. That which goes inside serves as a fillet to strengthen the joint, but any that comes outside should be scraped off before it sets because it simply smears up the surface and makes difficult the simple job of trimming off excess material on the bottom piece.

The remainder of the fuselage bottom is left open for the time being, so the rounded cowling comes next. This is installed in two pieces; one from nose to bulkhead 5, the other from there on back. These pieces should be well soaked in water, then bent to approximate shape. Don't cut them to exact size as they will shrink a bit upon drying out. Rather wait till they are thoroughly dry, then trim to fit. Put the forward piece on first. The rear piece is a bit trickier to fit properly, particularly the sternmost portion—here you can leave it wider than necessary, and smooth the joint off with sandpaper after the cement has set. Sand the entire fuselage with very fine paper, smoothing joints and rounding the edges slightly. Then cut the cockpit with a sharp bit of razor blade.

TAIL SURFACES—Since motor weight is concentrated at the nose there is no need to skimp on tail material, so 1/16" soft stock may be used. Cut the horizontal and vertical surfaces to outline shown. Round them on the forward edges and taper them a bit towards the rear. The stabilizer fits into a slot cut in both sides of the fuselage as far forward as bulkhead 7. After this surface has been glued in place, fasten the rudder atop the cowl.

Needless to say, great care must be exercised to line these pieces up properly both with the fuselage and with each other. The rudder should be carefully aligned along the fuselage center; the stabilizer should be parallel with the fuselage reference line (top edge of the side pieces).

At this point it is wise to give the assembly a coat of half glider polish and half thinner—it is much easier now than after the wings and landing gear are attached. Glider polish is simply dope with materials added that allow it to remain more flexible when it dries than is the case with plain dope. It is especially suited to thin balsa work since it has less tendency to warp the surfaces. If you can't obtain this liquid at your hobby store it is possible to make your own by adding a small amount of castor oil to the dope. The percentage varies according to the thickness of the dope used, but a basic proportion is a teaspoonful of oil to a pint; too much oil will produce a mixture that remains sticky after drying.

The surfaces should be sanded lightly with very fine paper before doping and again after. Use a single coat all over, including both sides of the tail surfaces. This doping adds only .05 oz. weight to the ship and produces a smoother, more efficient finish.

LANDING GEAR—The struts are cut from 1/16" thick hard balsa sanded to

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streamline shape; the spreader bar is of the same material. The struts are cemented firmly against the bulkheads for strength. Wheels are held by axles of 1/32" music wire; two loops of wire between the wheels and the portion of wire that is bound to the spreader provides considerable shock absorbing action.

Wheels from 1-1/16" to 1-3/16" diameter will do, but they must be *light*. The neat little rubber and aluminum wheels now on the market are far too heavy. If necessary you can make your own from two pieces of 1/8" balsa glued together with grains at right angles. Washers should be fastened to each side of the wheels, or a short length of small brass or aluminum tube will do as a hub.

WINGS—These are made of 1/20" balsa, cut and sanded to shape as was the stabilizer. The upper wing should be cut in one piece and, after sanding, moistened *lightly* with water on both sides. Curve to a slightly exaggerated airfoil shape and allow to dry. When thoroughly dry, cement the four ribs in place. The two innermost ribs are placed right at the point where the dihedral break comes. Carefully split the wing into three sections at these ribs, sand the edges so they butt smoothly together at the required dihedral angle, and cement firmly.

The lower wings are made in the same manner, except they are individual panels with no centersection. All wings are given the glider polish treatment after they are finished and before fastening to the fuselage.

Wing struts are of 1/16" thick hard balsa. Install the centersection struts first, cutting small holes in the cowling for them to pass through. Next cement the upper wing in place. Needless to say, this must be checked with extreme care to make sure it is at right angles to the fuselage and at the proper angle of incidence.

The lower wings are now cemented against the fuselage sides, temporarily held in place with pins and blocked up at the tips at the correct dihedral. The outer wing struts are installed last; note that all struts are glued against the wing ribs, holes being cut in the surface of the lower wings to allow this.

Don't omit the two bamboo strips which run through the fuselage and are cemented to the undersides of the lower wings. These strips help prevent the wings from tearing away from the fuselage if an obstruction is hit. After the wings are installed the covering on the bottom of the fuselage from bulkhead 4 to the nose is added.

MOTOR INSTALLATION—The powerplant is held in holes cut in bulkheads 2 and 3. These holes, and the others shown in the bulkheads, may be cut with the metal ferrule on a lead pencil from which the eraser has been removed. Note that the powerplant is mounted so that there is a small amount of downthrust (relative to the fuselage reference line).

Since bulkhead 2 takes most of the blow if the model hits an obstruction head-on, another piece of 1/8" sheet is glued to the near surface where the tank passes through, as a strengthening measure. The bulkhead grain is vertical, so the added piece is glued on with grain horizontal.

In our model the fuselage sides, cowl and bulkheads were assembled complete as detailed above. Then the nose was cut off with a razor blade, the powerplant fitted in place, and the inner nose pieces of 1/8" balsa cut to fit and glued to bulkhead 2. The nose piece is held in place

with a pin. The powerplant is held only by friction in the two bulkheads; this proved entirely adequate, as it can't turn because the cylinder is notched into the side of the fuselage. A hole is cut in the bottom of the nose to allow access for the tank filling pipe.

The propeller is cut from a blank as shown; it should be of a fairly heavy wood because balsa is too light. Pine, spruce, or wood of such weight is adequate.

FINISHING—All decorations are of colored tissue doped on. Struts, landing gear, cockpit edge and dummy motor are doped black. The motor and exhaust pipes are of very soft balsa. If you want to use authentic decorations, they may be obtained from Wylam's drawings in June 1947 issue of M.A.N.

For real flying results, don't overdo the decorating! We found that our decorations and added details increased the weight of the model .1 oz.; this doesn't seem like much until you realize that these details, which do nothing to aid performance, total up to about 1/7 of the total model weight, a really sizable proportion.

FLYING—As usual, the glide test comes first, after you have sighted carefully over wings and tail to make sure no parts are unduly twisted or bent. The stabilizer trailing edge can be bent slightly up or down to get a good glide; however, if more than this slight bend is needed, add weight to nose or tail to achieve balance.

For the first power flights, charge the tank with the cartridge holder nozzle uppermost—this will give only a short flight. When you are satisfied with adjustments, charge with the nozzle straight down (airplane upside down) and get ready for a chase.

Changes in motor speed are obtained by rotating the motor cylinder *slightly* in the crankcase—it is not necessary to loosen the locknut to do this because you can rotate the cylinder with your fingers. You can adjust for best duration or for high speed stunt flights, but the total range of adjustment is only about 1/8 of a turn so try it a bit at a time.

The original model was completed in northern New Jersey in mid-December when the weather was anything but helpful for outdoor testing. Still we have had many flights over a minute, and all indications point to much better results in better weather.

Hot Rock

(Continued from page 9)

trol ratio, a large movement of your handle will give a small movement of the elevator, therefore you are less apt to overcontrol your plane while test flying. Your first flight should be made on 50' to 55' flying lines having a diameter of .014".

For contest flying use .010 or .012 wire. Flying should be done from a smooth area, although the *Hot Rock* will take off from most any terrain. When your assistant launches the plane, instruct him to point the plane outward slightly before releasing it. Before launching make sure the engine is running smoothly and the fuel tank is more than half full. In all the models I have flown and in those with which I won the Open Stunt event at the Nationals, I used a stock *Drone* diesel engine; with an 11" diameter 10" pitch propeller, the model takes off like a scared rabbit and flies at approximately

55 miles per hour; this speed is maintained through most of the maneuvers. Using a Maeco constantflow tank the flight time will be from 4 to 5 min.

With neutral elevator your *Hot Rock* should be airborne after a short ground roll. Once airborne, trim the model for level flight with slow smooth arm movements. This should be done to feel out the model; if inexperienced, practice takeoffs, level flying and landings before attempting wing-overs and more advanced maneuvers. I would like to repeat here that at all times you should *keep your arm extended—do not use wrist movements for control!*

Many model builders have asked me why I fly all my ships counter-clockwise—simple reasoning and past success show that it is more natural to fly in this direction if you are right handed. While inverted your model then flies clockwise and propeller torque causes the model to bank outward, therefore you are assured of taut lines at the most critical part of the flight. This method of flying has proven very successful and is most universally practiced.

When flying inverted for the first time, remember that your controls are reversed—up is down and down is up. After several successful inverted flights your subconscious mind will cause you to react properly; then concentrate upon ironing out rough movements.

There it is men—its all yours now. The *Hot Rock* will do all the maneuvers you want it to do—and treat it right, for it can give you many hours of flying pleasure and really hold up under stiff competition.

Carve Your Own Gas Props

(Continued from page 17)

the engine shaft diameter. There is no point in having the propeller fit the shaft so snugly that it is difficult to mount or remove it.

Next transfer the face outline of one blade to the block, checking centerlines carefully; then use the same pattern for the opposite blade outline. Bandsaw this to rough shape, then place the blank in a vise and rasp the outlines accurately.

The side pattern, indicating taper, is next marked onto the sides of the blank with centerlines, again being carefully checked otherwise the propeller may be carved out of track to begin with. The blank is held on edge now and the excess wood is bandsawed off. This is a little more difficult since the block now has curves in it. Saw just outside the line and depend on rasping to bring the block to final outline.

Clamp the blank, near the center, in the vise and begin the carving on lower surfaces first. Best tool is a sharp drawknife. Use diagonal strokes, removing thin shavings and working to within 1/16" of the block edges. Make the lower surfaces flat for the time being. Before proceeding to the upper surfaces it is best to rasp these lower sides to nearly final shape, because it gives us an accurate reference to blade thickness as we carve the upper surfaces. Use the curved side of the rasp and make strokes in only one direction—opposite to that which scuffs the grain. The rasp is a most useful tool when you learn to handle it. You will find that the wood can be finished to surprising smoothness and worked most easily when you use long, diagonal strokes with a twist to the handle at the same time.

Use the drawknife again to shape the upper surfaces, leaving excess material again for final shaping. Check crossections frequently to get the correct taper in thickness from hub to tip, and be particularly careful to make both blades identical. Rasp these surfaces as you did the lower ones, getting the trailing edges quite thin and making the leading edges a bit more rounded. Shape the hub areas and balance the propeller on a knife edge. Rasp away wood from the heavier blade, but don't do this if it deforms the shape; extra finish can be put on the lighter blade, as a last resort, to bring the propeller in balance.

Remember in all carving and rasping to discover the direction in which the drawknife "digs in" or the rasp scuffs the grain. For best results make all strokes in the opposite direction.

Sand the propeller thoroughly to remove all rasp marks, using medium grades first, then fine paper. Balance the propeller from time to time and get it in balance at this stage if possible. Smooth the outline of one blade to even lines, make a paper pattern of this blade and use it to make the opposite one identical.

Finish is up to you. It may be model dope, lacquer—clear or colored—enamel, varnish or what have you. Since alcohol racing fuels tend to dissolve most any finish except enamel or Aero-gloss, we have lately been using a plain waxing as the only finish. Make several applications with thorough rubbing and you can get a satisfactory finish.

You may never carve all your own propellers — few modelers do — but a knowledge of how it is done is always valuable. Many expert fliers buy ready-made propellers and work them down to their own needs.

Plane on the Cover

(*Continued from page* 19)

and mechanical brakes. The tail wheel is mounted on a flexible spring steel assembly and is a tiny, doughnut wheel.

With vision a major requirement in the new design, Luscombe chief engineer Eugene W. Norris fulfilled this demand to the "nth" degree, and there are few other airplanes in the air regardless of type, with better vision not only for pilot and co-pilot but the passengers as well. The nose of the airplane is low and flat and the *Sedan* comes as close to a full 360° vision as any cabin airplane with the wing atop the fuselage.

The *Sedan* is powered by a Continental 165 hp engine. The price of this engine was recently increased while that of the Franklin aircooled 165 hp model remained unchanged. Luscombe promptly made design studies of a Franklin powered version of the *Sedan* and has test flown an experimental model to determine the feasibility of the design. With the Stinson using the lower cost Franklin, Luscombe is at a competitive disadvantage with the higher cost Continental. The latter engine, however, runs more smoothly due to its lower cruising speed.

The interior of the *Sedan* is astonishingly roomy, actually far larger than the closest study of its exterior lines would reveal. Large, very wide doors are used and it is an extremely easy airplane to get in and out of with a large step on the landing gear strut. The door windows may be raised or lowered in flight for additional ventilation. Baggage storage is under the rear seat with a space 13 in. high, 19 in. deep and 42 in. wide. The rear seat may be removed by detaching two locking pins, thereby making room for considerable bulk cargo. The front seats fold forward for ease of access to the rear seat or for loading bundles.

The instrument panel is neat and elaborate enough to justify the luxury nature of the airplane. The throttle, mixture, carburetor heat, primer and starter are all located in the lower center portion of the panel, with the flight instruments mounted in the upper centersection. An interesting safety feature is the location of the fuel shutoff valve which, in the off position, extends directly across the ignition key insert. Thus, it is necessary to turn on the fuel before the airplane can be started, a clever arrangement and an insurance policy against taking off with the two 20 gals. fuel tanks off. Fuel gauges are mounted on the lower left side of the panel, and the cabin heat control on the lower right side. Two roomy glove compartments are mounted, one on either side of the panel. The radio is centrally located in the upper center of the panel and the Bendix five-channel VHF set, which includes the 200-400 kc and 400-1500 kc reception bands, is neatly installed.

Dual control wheels are fitted and these are the modern "push-pull" type mounted directly in the instrument panel. Wheel brakes are on the pilot's pedals with the parking brake handle under the left side of the panel. The flap panels are hydraulically operated from a handpump mounted on the floor to the right of the pilot's seat. The flaps are retracted by a pressure release valve.

A safety feature of the *Silvaire Sedan* is a spring connection between the aileron and rudder cables which permit two-control operation of the airplane. In addition, the spring may be easily overcome to permit crossing controls, an emergency feature desired by three-con-

trol proponents. By thus creating a combination two- and three-control airplane, Luscombe may have solved one of the hottest controversies in personal aircraft flying. The system permits flying the plane with the rudder pedals alone (while studying a map or reading a book) or with the wheel alone (while resting the feet).

Flying characteristics of the *Silvaire Sedan* are easy and straightforward although the low, long and flat nose of the design gives a new pilot the feeling he is in a slight dive. This results in his unconsciously keeping the nose high, resulting in a steady climb. The craft has a rate-of-climb of nearly 1,000 ft. per minute, really phenomenal for a plane of its type.

The high aspect ratio wing has a decided washout which prevents sudden stalling and produces ample warning under ideal circumstances. However, the flaps up stall is unusual in that a "double stall" seems to occur involving a second stall just as recovery from the first stall is begun. However, with flaps down the stall is gentle but produces an extremely high nose-up attitude which interferes with forward vision. The *Sedan* has a remarkable gliding angle and will float right out of the airport unless carefully watched. However, when flaps are lowered, the craft comes down smartly and glides steeply into the field.

Cruising speed is 130 mph at 1850 rpm. It has a top speed of 155 mph and lands at under 60 mph, good performance for a 2280 lb. craft. It is designed to carry four passengers and 100 lbs. of baggage, or a pilot and 600 lbs. of cargo, over a range of more than 500 miles on 40 gals. of fuel. This is approximately the performance of the new Stinson *Voyager*, al-

though the *Sedan's* phenomenal rate-of-climb is considerably higher than that of the *Voyager*.

Much of the appeal of the new *Sedan* was destroyed last November when Leopold H. P. Klotz, Luscombe president, announced the price tag: $6995 flyaway Dallas! Hopes that the craft would sell in the $5000 class were smashed with this announcement, and Luscombe's competition for the Stinson market appeared doomed, considering the latter's price of $5989 flyaway Wayne, Mich. This $1000 difference may mean the difference between success or failure for the new *Silvaire Sedan* in its struggle with the Stinson competition.

However, both Klotz and Norris are confident that this price can be cut down to a $5000 level through production economies. Luscombe has repeatedly slashed the price of their popular two-seat *Silvaire*, reaching as low as $2295, and these reductions were made possible by continuous simplification of the airplane and its tooling. E. W. Norris has accepted the challenge of simplified, economical productivity of the new craft and has already promised that increased production savings will be passed on to the customer in the form of price slashes.

Entering the picture shortly will be the new *Cessna 170*, and Piper is rumored to be ready to announce production plans for a four-place *Super Cruiser*. With the Luscombe-Stinson-Cessna-Piper battle certain to prove one of economics, customers for a four-place airplane are guaranteed a $5000 airplane by the end of the year. This hoped-for goal will not be met of course if materials and wages continue their climb, but none of these companies can long stay in business under the rigorous competition for a rapidly diminishing market.

Flying Fleet Canuck

(Continued from page 21)

rejoin with 3/32" crossmembers using the top view as a guiding jig. Cut the various formers from 1/16" sheet. Stringers are 1/16" sq. strips, and it should be noted that the top one is not installed until the centersection is in place since it joins it. Cover the nose with 1/32" sheet balsa as shown by the shaded areas on the drawings. The removable nose block is made from laminations of 1/8" sheet, and it had an additional section cemented to its back to enable it to be fitted accurately into the cut-out in bulkhead A. The carburetor intake fairing under the nose is a solid balsa piece cemented to the cowl. Scraps of balsa are used for window outlines as well as for the balsa retainer for the bamboo dowel in the rear which serves to hold the rubber strands.

Make full size plans of the right and left wing panels and the centersection so construction can be done atop them. Using the rib pattern given, cut the airfoil sections from a sheet of 1/16" balsa that has been sanded down somewhat to reduce its weight. Tip pieces are cut from 3/16" sheet and spars are 3/32" sq. hard strips. Leading edges are 1/8" x 1/4" while the trailing edges are 1/8" x 3/8" tapered as shown. Cement all parts together; when dry, finish the edges and tips by trimming with a razor blade and sanding. Now permanently attach the finished centersection to the fuselage.

Tails come next and both stabilizer and rudder are of similar construction. Make the complete frames using 1/16" sheet for outlines and 1/16" sq. strips for ribs and

spars. When the frames are dry, remove them from their jigs and add 1/16" sq. pieces to each side of each rib. These are then cut to the symmetrical airfoil shown.

To obtain fine flights from any flying scale model an efficient propeller must be used. Select a hard balsa block of the dimensions given and cut a blank to the shape indicated by front and side outlines. Drill the hole for the prop shaft and carve a right hand propeller. Carefully sand and balance the nearly finished prop, then apply several coats of clear dope to produce a smooth, hard surface. A free wheel gadget—as shown in the corner of the drawing and made from a thin piece of brass or steel—will enable the propeller to spin freely once the power is exhausted and thus improve the glide.

Making the two floats is an easy job. They consist of 1/32" sheet balsa sides, tops and bottoms, 1/16" sheet balsa bulkheads and solid balsa noses. To build them, first cut the top sections of each float from 1/32" sheet. This part is shown on the top view and is represented by the two innermost lines on the floats. Over the top sections erect the bulkheads in their respective positions; into the slot in each fit the 1/16" balsa keel that is shown by a broken line. Now cut the sides, the true depth of which is indicated by a lightly broken line to which the note refers on the plan. These are cemented to place, and finally the bottoms are fitted by the cut-and-try method. Carve the nose blocks from light balsa and they are finished except for covering.

Bend the landing gear and float struts from .040 dia. music wire to the shapes shown. Neatly bind front and rear landing gear struts to the fuselage using thread, and join their lower ends by soldering or by binding with thread. There is a triangle of 1/32" sheet balsa fitted between the front wires to simulate the enclosed struts of the real aircraft. The float struts may be bent at this time but they are not used until later.

Before starting to cover the frames, sand them thoroughly to remove all flaws and roughness. Colored tissue is used and numerous individual sections should be employed in covering curved sections to avoid wrinkles. We found banana oil to be the best adhesive but light dope is satisfactory. Lightly spray the covered parts with water to tighten the tissue but do not dope them until the whole model is assembled.

The various parts may now be assembled. Make paper patterns of the windshield and windows by the cut-and-try method before cutting them from thin celluloid. Then cement them to place carefully avoiding cement smears that would mar the transparency. Fit the stabilizer to the position indicated and cement it fast. Off-set the rudder a bit so the model will turn right in the glide and cement it firmly. Wings have 11/16" dihedral at the point shown. The wing struts are balsa strips of streamline crossection; they are shown by broken lines over the wing plan. Wheels may be purchased or can easily be made from laminations of 1/8" sheet balsa. They should have washers cemented to their sides to permit them to revolve freely.

The floats are joined by two rounded pieces of bamboo which are cemented across their top surfaces at positions shown; scale the drawings to get correct float spacing. To make the wheels and floats interchangeable, rolled paper tubes into which the wire struts fit snugly are cemented to the floats. There are four of

these tubes; the two main axles are sprung together and then slipped into the front tubes. The float struts fit in the rear tubes and the tops of these wires are sprung apart to fit into holes in small washers or bushings which have been cemented to the lower fuselage, as shown. Use of this very simple method makes possible the change from a land to water plane in a matter of minutes.

Now that everything is assembled, several costs of clear dope may be brushed on the entire model, and it would be well to apply at least two additional coats to the floats. We have found zinc stearate to be one of the best possible waterproofing mediums, and if you expect to do extensive hydro flying with your *Canuck* you should investigate the possibilities of this substance.

Items of detail always make a model much more realistic. Cowl openings, control surface outlines, doors, license numbers, etc. are easily represented by contrasting tissue and they go a long way towards improving the model. Needless to say, all exposed wood parts should be colored with paint or dope.

Bend the propeller shaft from .040 dia. music wire. Slip the nose plug, several washers and the propeller on in that order. Then bend the front end to suit the free wheeler being used, and at the same time make a loop into which a mechanical winder can be hooked.

The amount of power required will vary with models but 8 to 10 strands of 1/8" flat brown rubber should be about right. Lubricate the strands with a rubber lubricant (tincture of green soap and glycerine) and then attach to the prop shaft. Drop the other ends through the fuselage and slip the bamboo pin through the loops. It may be necessary to remove a small section of tissue under the stabilizer to accomplish this.

Your *Canuck* should balance at about the quarter chord (from leading edge) position when suspended by the fingertips. Add weight if necessary to attain this condition since only very minor adjustments are made by warping the surfaces. Glide the model over deep grass making any further weight adjustment to get a good glide.

Power flight adjustments are made by off-setting the thrust line. Start with just a few turns—then use more power as flights improve. Placing a sliver of wood between the top of the nose block and nose, tilting the thrust line down, will aid in ironing out a stall, while right or left thrust achieved by putting the sliver at the side will reduce the power circles.

When using floats, set the model gently on the water's surface being careful not to douse the pontoons because that adds weight and may interfere with takeoffs. Quarter the model into the wind so it will turn into its natural direction and be right into the breeze as it gets under way. In helping it along, thrust it gently and it should skim along for a short distance before easing free of the surface. Incidentally, when changing from floats to wheels and vice versa, the center of gravity will be changed too, so it must be corrected by reballasting.

For really long flights use a mechanical winder. Hook it to the loop in the prop shaft and stretch the rubber out the nose about three times normal length before starting to store up power.

The *Canuck* is a trim little ship, light in weight (ours weighs 1.7 oz. with wheels, 2.1 oz. with floats) and graceful in flight. You will find that it is as much at home on land, water and in the air as a gull.

Flash

(*Continued from page 2*)

FOLLOWING REVISIONS made as a result of scientific wind tunnel tests at Krook's Aerodynamical Laboratory, Carderock, Md., Willard Custer expects to have his new "Channel Wing" airplane flying again early this spring. Previous wind tunnel tests had been on a 1/3 scale model of the channel and the extrapolation of these results to full scale would have been hazardous. However, Prof. Krook's full scale tests have proved the design even more phenomenal than had earlier been expected. The Custer "Channel Wing" consists of two semi-circular (front view) planes in which propellers rotate. Theory is that airflow over the channels is induced by the propeller instead of by forward flight, enabling the queer craft to generate vertical lift.

EXTENSIVE CHANGES in National Air Races events loom as a result of the 1947 races which established beyond all reasonable doubt that the airplane had outdistanced the rules. A special technical committee has presented a number of recommendations to the contest board, which will meet in March. Chief of these changes are: limit engine "souping" to an output within the mechanical limits of the materials used; limit the reciprocating engine division of the Thompson to 10 starters instead of 12; use a six- instead of a four-pylon course for the jet Thompson; install red and green blinker signals atop pylons; required forced cockpit ventilation (poor ventilation is believed to have caused the death of Tony Jannazo); establish a 200 ft. minimum altitude for "big" airplane races; and install field telephones at each of the pylons for constant communication with timer's booth in grandstand. Air Force still refuses to race its jets against foreign jet craft, a race unparalleled in interest should it take place. Reason for the refusal remains obscure to date.

JUST WHEN MANY were writing *finis* to the career of the propeller-driven fighter comes word that Grumman is now at work on a new order for the potent F8F-1 *Bearcat* that will keep the tiny killer in quantity production throughout 1948. Newest version is the F8F-1d armed by four rapid-fire 20 mm aircraft cannon. Navy's reasoning behind the new order is simple: as far as the carrier is concerned there is not yet a fully proved jet fighter, whereas the rugged *Bearcat* is the "old reliable" as far as several thousand naval aviators are concerned. Since Navy's job is to keep a fighting force "ready to go" day or night, then it's the *Bearcat*, at least for the next two or three years.

AFTER MUCH experiment with German type "ribbon chutes" for high speed bail-out, Navy has quietly cropped up with a high speed parachute that solves the problem neatly and simply: a chute with an "air valve" in the top! Yes, believe it or not, Bureau of Aeronautics Airborne Equipment Division has tested a new parachute with a large 6 ft. hole in the top covered by a second panel on elastic bands. As the pilot bails out at up to 500 mph, this top panel "gives" and allows the air to rush through the slot provided by the expansion of the bands. As the 'chute slows, the elastic bands draw the panel down tight and the parachute works like any other during the remaining portion of the drop.

FIRST FLIGHT OF THE radical Boeing XB-47 took place with better-than-hoped-for success, and test pilots Robert Robbins and Scott Osler were actually exuberant following the one hour flight from Boeing Field, Seattle to Moses Lake Air Force Field in central Washington, where the Phase I (company) test flights will be carried out. A second and a third test flight were carried out shortly thereafter and the stability and control of the 35° sweepback

MORE RADIO CONTROL

The ultra simple system described by Bill Rhodes in M.A.N. last year provoked much interest among R.C. enthusiasts. One of these, Herb Owbridge of Burbank, Cal., has done a great deal more development work along the same line, and presents the results of this work in April MODEL AIRPLANE NEWS—don't miss it!

wing proved excellent. Lateral control is attained by spoiler panels located on the wing leading edge, the panel causing the wing to lose lift and consequently drop to create the desired bank. Flights up to 400 mph have been made, and insiders quote a top speed for the giant better than the existing 650 mph world's record. No. 2 plane has been completed and will join its counterpart at Moses Lake early this spring.

LOOK FOR spirited competition for the up-coming Air Force order for "medium" cargo planes. Glenn L. Martin has demonstrated its 2-0-2 to military observers at Wright Field, Washington National, Quantico, Va. (Marines) and Patuxent Naval Air Station. Convair's *Convairliner* has been shown to the Air Force at Washington National and Wright Field. In addition, Air Force engineers have studied specifications and demonstrations of the Northrop *Pioneer*, and Lockheed *Saturn* and data on the Douglas DC-9. With a considerable quantity order assured, none of these manufacturers is sparing any pains to give the Air Force (not to mention the Navy and Marines—just in case) all the information it needs to reach a friendly decision. Order won't be placed till spring or later but it will mean 50 airplanes with options on 100, 200 and 500-lots for order in July 1948.

AIR FORCE has announced in great detail its plans for the aerial defense of the nation adequate to fight a sustaining action for 18 months—during which period it believes the aircraft industry could have accelerated to quantity production. The entire Air Force would require 131 air groups, a total of 12,441 planes of which 6869 would be first-line combat planes and the remaining 8100 reserve, 3212 National Guard, 2360 in organized reserves and 2528 in storage. This program hinges heavily on the current 70-group program of which only 55 groups are currently activated. The 131-group program is broken down into 22 normal fighter groups, 3 all-weather fighter groups, 4 tactical reconnaissance groups, 21 very heavy bomber groups, 5 very long range reconnaissance groups, 5 light bomber groups, 10 troop carrier groups, 22 special (helicopter, air-sea rescue, liaison, Air Transport Command, training), 27 National Guard groups, 34 Air Reserve Groups, a total Air Force of 153 air groups available for duty. This tremendous program casts an entirely different light on the dramatic plea for salvation by the aircraft industry when the annual production rate demanded by this new Air Force program (3200 planes with 46,414,000 lbs. of airframe weight) exceeds that voiced by the industry as the minimum required for its survival (3000 planes of 30,000,000 lbs. airframe weight). The public announcement of this program is also an interesting commentary on how the U.S. Government feels about the need for military secrecy in these times!

CERTIFICATION OF THE *Convairliner* paves the way for delivery of this close competitor of the Martin 2-0-2 as the U.S. postwar medium airliner. The two transports are near identical with the *Convairliner* having a noticeable edge in the size of its contract backlog. First deliveries of the new craft, Convair's first commercial airliner since the ancient Model 100 flying-boat of the old Key West-Havana line, are slated for American Airlines. These, however, were delayed when it developed that the war surplus engines American purchased for installation in their fleet developed only 1975 hp instead of the 2100 hp originally scheduled for certification. The engines may be modified to meet the requirement, however, and the blue and gold AA colors may soon be flying the southern route on these fast new liners.

GUIDED MISSILES continue to make sporadic news, most recent of which is Convair's secret missile which was revealed by complaining San Diego residents! Seems these latter became annoyed at the noise originating at Point Loma, and Convair revealed that the noise was static tests of their new rocket missile. Simultaneously, they announced that no flight

tests of the missile were being made there—these were taking place at Point Mugu, Calif. (200 miles to the north)! Such are the simple ways in which vast military secrets are revealed. Ryan Aeronautical Corp., also of San Diego, remains in the guided missile business with receipt of a new $1,070,000 Air Force contract for production of its missile, the third increase in the company's original contract.

AIR FORCE continues its interest in gliders, believe it or not, with delivery of the first of two XCG-18A designs by Chase Aircraft Co. of Trenton, N.J. The first all-metal cargo glider, the giant craft has an 86 ft. span and is 53 ft. long. It is designed to carry 30 troops or a cargo load of 8000 lbs. Known as the *Avitruc*, the huge glider features a rear cargo door, tricycle landing gear and a thin wing for low drag.

SOLUTION TO THE perplexing problem of the Northrop XB-35 *Flying Wing* propeller gear box difficulties appear at hand with the decision to use single rotation four-bladed "paddle" propellers. Repeated failure of the counter-revolving design used on the two prototype aircraft, now at Muroc Air Base, has cut flight test time to only a few hours. The new props are expected to put the propeller-driven XB-35 back in the air to provide the first full scale flight test comparison of a propeller and turbojet version of the same airplane, in this case the YB-49 jet driven *Flying Wing*. Flight tests on the eight-jet version continue with a minimum of difficulty, and test pilots report the sleek craft "unbelievably" fast and with an "astonishingly" high rate-of-climb.

POWERFUL Curtiss XP-87 "all weather" fighter, powered by four Westinghouse 24C jet engines, has completed its long overland journey from Columbus, Ohio to Muroc Air Base, Calif. and may have made its first flight by the time you read this. Huge craft features side by side pilot-radar operator to enable close cooperation between the two.

Those Important Wires

(Continued from page 29)

70-foot lines would exert a centrifugal force of 3 times 21.5, or 63.5 lbs. It may be seen, therefore, that the recent requirements of the A.M.A. that wires be tested to 20 times the model weight may be slightly underconservative. Presumably, however, anyone experiencing loads in the neighborhood of 60 lbs. would adjust the rudder of the model to reduce these loads and as a consequence they would actually fall within the limits of the A.M.A. requirements.

When a model takes off there is a vertical component of the centrifugal force which assists the takeoff. If we assume a 4 ft. difference in level between the model and the control handle, we have

$$L = \left(\frac{4}{R}\right) C.F.$$

where L is the lift due to the wires. This lift has been computed and is plotted in Fig. 4 for a 1 lb. model. As you can see, a speed of almost 100 mph is necessary for a wingless model to lift from the ground on 50-foot lines. It is obvious that despite what some detractors claim, control line models are real airplanes, since they need wings to get them off the ground!

It appears that "whipping" can be done in two ways. One can walk around in a small circle and, by doing it properly, can reduce the distance the model flies and also lead the model. One can also stand in one spot and lead the ship. It is quite common to "whip" by having the extended arm at almost right angles to the wires (i.e., to be leading the model by

about 90 degrees.) If we assume that by this means we advance the control handle two feet ahead of the center of the circle at all times (or, in other words, that the hand is about two feet from the center of rotation of the body and that the forearm is at right angles to the wires), then we can compute the "whipping" effect of the wires. The forward component, T, is

$$T=\left(\frac{2}{R}\right)C.F.$$

Curves of T are given in Fig. 5 for a 1 lb. model.

Let us evaluate all of these various calculations. But first we should also consider the formula

$$T.H.P.=\frac{DV}{375}$$

where T.H.P. is the thrust horsepower, D is the drag, and V the velocity in mph.

Looking at Fig. 1, we see that a model using .016″ wires and flying at 125 mph on 70-foot lines will have a drag force of 2.29 lbs. exerted on it by the wires. This is equivalent to:

$$2.29\ x\ \frac{125}{375}=.763\ H.P.$$

Now if the model weighs 3 lbs. the load on the wires will be 14.9 times 3, or 44.7 lbs. (Fig. 3); and if we "whip" the airplane, in the manner assumed above, we can get a forward component of .426 times 3, or 1.278 lbs. (Fig. 5), which will reduce the thrust horsepower required to carry the wires to

$$(2.29-1.278)\frac{125}{375}=.336\ H.P.$$

—a reduction of .427 hp, or 56%. It is quite apparent why pylons are now required for racing!

Recent surveys of model airplane engines indicate the power available from various classes of engines. Class VI racing engines, for example, are capable of developing at least .75 to 1.0 hp. It is obvious, therefore, that the wire drag of .763 hp on the model cited above is by far the largest part of the total drag. Computations made for all classes of racing planes indicate that about 80% of the engine hp is used to overcome the wire drag.

As a result of this analysis, it is evident that the highest speeds will be reached by using the shortest permissible lines with the smallest allowable wire diameter. While the ship should be as streamlined as possible, slight protuberances which increase serviceability are not too important.

In other words, get a good stable model and then work on the engine and propeller to obtain maximum performance. Light weight is important as it permits reduction of the wire diameter.

No License-Free R.C. Band Yet!

WE have heard rumors going the rounds that the F.C.C. has assigned a band for Radio Control model work, and that no license is required. Take our word for it that *no such operation has been authorized!*

R.C. operation is legal only in the regular amateur bands, and an amateur station and operator's license is still mandatory for such operation. There is a good possibility that license-free R.C. work will be allowed in the Citizens Radio Band, but this band has not been officially opened by F.C.C. and probably won't be 'till much later in the year.

Rest assured M.A.N. will carry full details of any new bands available for R.C. operation.

Design Forum

(Continued from page 20)

erly adjusted, the wings and tail surfaces must be set correctly relative to one another and to the thrust line. Usually each design of airplane requires a different adjustment. This is what makes the problem so mystifying. You will read in one place that you should set the wings at 3° and the stabilizer at zero, and you hurry to try out this arrangement on your model, only to be disappointed with the results. The model doesn't fly any better than it did before.

Actually, this might have been the correct setting for a particular type of airplane. At least do not give up your investigation of this phase of model building, because unless you solve it, you will never win contests consistently.

Let us get down to brass tacks and see if we can work out some practical working basis for adjustment of all types of models. The reason this problem has been so difficult is that there are many more factors involved than most people realize. The basic ones are weight *W*, lift *L*, thrust *T*, resistance of the airplane *R*, and tail pressure *P*. These are the forces acting on an airplane in flight. It is simple enough to arrange them or to place the wings and other parts of the airplane in such a position that these forces are balanced when the ship is in horizontal flight. However, in a model airplane the trick is to arrange the wing and tail surfaces so that *the forces change when the airplane's flight attitude changes, and corrective moments are generated* by the change of the forces.

Longitudinal instability causes most of our troubles. To provide a corrective change in the forces longitudinally, the stabilizer is set at a negative angle relative to the wing. Fig. 1 shows the basic arrangement for longitudinal stability. The thrust line and the line of resistance are coincident and therefore do not generate any stalling or diving moments when the plane is in flight. The wing is set at 2° angle of incidence as indicated. This gives proper lift in level flight. The stabilizer is set at minus 1°—that is, minus to thrust line, the thrust line being the reference line for all wing and stabilizer angles. Weight *W* acts at a point approximately 33% back of the wing leading edge. Lift *L* reacts slightly back of this point.

When the plane takes off under full power forces will be generated as shown in Fig. 1. The downward pressure on the stabilizer *P*, will be strong because the plane is flying fast with stabilizer set at —1°; the tail, therefore, is depressed and the whole airplane is nosed upward into a climb through the reaction of the couple *PM*. Obviously, as the ship climbs this couple continues to act, and the nosing up effect increases until the plane stalls or loops if a balance or correcting couple does not come into play. This balancing couple is *WT*, tending to nose the plane downward. As the angle of climb increases the speed of the plane diminishes so that *MP* finally is reduced to a value equal to *WT*. The airplane then will be balanced in climb and will continue to climb at that angle unless its speed is changed.

If it is a rubber powered model the power grows less as the rubber unwinds, therefore the power will drop as the flight progresses. Consequently speed will become less, the nosing up moment *MP* will become less due to less pressure on the stabilizer, and the model will nose gradually downward from its original normal steep angle of climb until finally it will be flying along a comparatively level course. The characteristic of the airplane which provides this correcting moment *MP* is the difference in angle between the stabilizer and wing.

When the stabilizer is flat in section or of uniform section top and bottom, the difference in angle between it and the wing should not be less than 2-1/2°. The average value is 3°. This difference provides excellent longitudinal correction when moment arm *M* equals 3-1/2 times wing chord *C*.

It is a practice among many model builders to use lifting stabilizers—that is, they are flat or positively cambered on the underside and positively cambered on the upper, same as a wing. This type of stabilizer gives greater buoyancy.

Their value was discovered in 1919 by the author when he was confronted with an unusually cranky tractor model with heavy distributed weights; a flat stabilizer absolutely refused to work but a cambered stabilizer provided perfect flights. Usually it is assumed that the latter is 50% more effective. The setting for a cambered stabilizer is different from a flat one because the former lifts at a negative angle. Usually minus 3° is the angle of zero lift for a cambered surface. This varies of course with the amount and type of camber, but for practical purposes we suggest you use this value for the angle of zero lift. Therefore, if we are to use a cambered stabilizer on the plane indicated in Fig. 1 so as to give the same effect as a flat stabilizer set at minus 1°, we must set the cambered stabilizer at minus 1 plus minus 3, or minus 4° relative to thrust line. This means the cambered stabilizer should be set at 5° to 6° angle less than the wing. Actually the difference in angle may be smaller; in some cases as small as 3°.

The lack of stability due to the lesser angle apparently is overcome by the greater stabilizing effect of the cambered surface. The basic arrangement is a condition that arises where the thrust line is slightly above the wing center-section. A good example would be a stick model with the rubber on the upper side of the stick and the wing fastened to the underside. The upturned dihedraled wings raise the center of wing drag to a point slightly above the thrust

line. This is balanced by a landing gear extending downward, causing drag below the thrust line, the resulting total drag reacting approximately at and coincidental with the thrust line.

In Fig. 1 the wing position and the landing gear is shown with broken lines. Most models however do not resemble this setup, the majority being of the parasol type shown in Fig. 2. Here we have the same forces reacting but in different positions. Parasols were originated to obtain greater stability due to greater distance between the wing and the center of gravity *CG;* the *CG* acts in such cases like a pendulum. When a plane with a pendulum *CG* noses up or down or rolls sideways, a righting couple takes place between lift *L* and weight *W*, which tends to restore normal balance. This is one of the advantages of the plane in Fig. 2. However, we also have a disadvantage.

The line of resistance *R* now is raised so that when under power and flying fast we have an extra tail depressing moment *RS*. Under these conditions the old stabilizer setting is impossible, because with the moment *MP* and the added moment *RS* the plane will nose up sharply and loop. We can really turn this setup to advantage. Instead of setting the stabilizer to produce the nosing up moment, we will let the resistance *R* produce this moment because moment *RS* due to *R* reacts in the same manner and at the same time as tail moment *MP*. Thus we can set the stabilizer at a positive lift angle relative to the thrust line, or at least parallel to it. If parallel to the thrust line there will be no pressure *P* on the stabilizer. Under speed the plane will nose up due to the couple *RS*, between

GRUMMAN'S LATEST FIGHTER

The line of fighter planes carrying the Grumman name has always been famous, and we feel their latest—the F9F Panther—is a worthy addition. This is their first jet job and it will be our feature plane for the April issue of MODEL AIRPLANE NEWS

thrust *T* and resistance *R;* as the thrust diminishes the couple will become less and the plane will nose over into level flight; when the thrust stops completely the plane will nose over still more into a gentle glide.

If the wing is placed very high above the thrust line it will produce considerable distance between *T* and *R*, and the resistance couple will be so large that the nosing up effect under speed will be sharp if the stabilizer is not set at a positive angle that generates a counter nosing-over moment.

So we see that when the wing is raised only slightly, the stabilizer may be placed at zero. This corresponds to a high wing model where the wing rests directly on the fuselage. The stabilizers of such planes should be placed at zero relative to the thrust line unless they are cambered surfaces; then they should be placed at 2° to 3° negative. When the wing is placed well above the thrust line in a parasol position similar to pylon models, the stabilizer should be given a positive setting of 1/2° to 2°. If the stabilizer in such a case is set at 2°, the wing should be set at 5° in order to give a difference in angle of 3°. (Note: 1° =1/16" rise for each 3-5/8" chord.)

Many of the settings given here and their resulting characteristics are known to expert model builders. But there is one setting that is known to very few of the experts: the correct setting for low wings. When the wing is placed well below the thrust line as in Fig. 3, the resulting drag *R* is below the thrust line and under power causes a nosing over couple. This is directly opposite in effect to high or parasol wing planes and counter to the maneuver required for a climb. Consequently, couple *MP* due to the negative stabilizer must be so large that it not only overcomes the nosing over couple due to drag *R*, but also is great enough to nose up the airplane into a normal climb.

Most model builders, when they attack this problem, set up their airplane as in Fig. 4, giving the wing 2° or 3°, the same as the high wing model, and placing the stabilizer at zero. Then they balance the model for flight by moving the wing relative to *CG* or vice versa. Usually the *CG* ends up back of the center of the wing, as indicated, resulting in a clockwise couple *WL*, tending to depress the tail, that balances the counter clockwise couple *RT*, due to the thrust. If such a plane is balanced for "power-on" flight it will stall when power ceases and will refuse to glide. If it is balanced for gliding it will refuse to climb. The answer lies in the incorrect setting of wing and tail.

In low wings—or more correctly where line of resistance *R* is *below the thrust line*—the wing should be set at zero angle and the stabilizer at 2° to 3° negative as in Fig. 3. This setting will produce the proper nosing up couple to overcome the effect of the high thrust and to produce sufficient climb. You will find it will climb properly under power and assume a normal glide when power ceases.

From our examination of these three types of ships we make a very interesting observation. Apparently the higher the wing is placed the more positive the stabilizer is set; the lower the wing is placed the more negative it is set. The point of zero setting of the stabilizer is a mid-wing with the thrust line slightly above the wing centersection when normal dihedral is used. Now you can go ahead and use this information for any type of model other than the diagrams specifically given here.

Fig. 5 shows a series of wing and stabilizer settings for various positions of the wing taken vertically. A very important point in regard to these angular settings is brought up by Howard H. Lundquist of Minneapolis, Minn., who has written in to tell of a very interesting machine he has built and flown and which is pictured herewith. In effect it is a low wing with a large stabilizer placed well above the wing and to the rear. However, the distance between wing and stabilizer is comparatively short, not more than 2-1/2 times the wing chord.

Mr. Lindquist states he used an M 12 in order to obtain a favorable *CP* travel. The front wing is set at 2° incidence and the rear one at 4°. When the ship was flown it proved to be jumpy and erratic and had to be adjusted with the greatest of care. Mr. Lundquist says that no doubt the short stabilizer moment arm caused this condition.

Fig. 6 shows Mr. Lundquist and his unusual plane. We are inclined to agree with him in respect to the moment arm. However we believe that most of his trouble is due to the incorrect setting or relationship between wing and stabilizer. The stabilizer is set more positive than the wing, whereas it should be more negative than the wing. Such a condition makes it nearly impossible to fly any airplane. In fact, any deviation from flight would be increased rather than corrected by such a setting. It is possible that the stabilizer setting is less than plus 4° to the relative wind because of the down-wash resulting from the forward wing. If the down-wash at the stabilizer is —4°, the stabilizer will be flying at zero relative to the airflow.

To make this a steady flyer we suggest the wing be raised to the top of the fuselage and the stabilizer lowered to the bottom. Such an arrangement tends to neutralize the bad effects of a short moment arm. In fact, results would be far superior and it would be simpler if the fuselage were lengthened considerably and the moment arm increased to at least 3-1/2 times the wing chord. For any angular difference between wing and stabilizer the angle of flight reaction is inversely proportional to the length of the moment arm. This means that if the moment arm is short and the plane starts to nose up, it will nose up very sharply and quickly. If the moment arm is long, it will nose up gradually and slowly even though the angular settings are the same.

We have had several questions concerning how to find the *CG* and *CLA*. The *CG* of course is a point and it can be found easily if the model is suspended at the end of a thread or a string from some point near the nose or even the wing leading edge, as in Fig. 7. Continue the line of the string down across the side face of the model. Draw in this line if

necessary as indicated. Obviously, the *CG* lies somewhere on this line. Now, suspend the model at some other point nearer the tail and continue the line of the string down across the side of the model. The *CG* will be the point of intersection of the first and the second lines. Obviously your plane should be symmetrical to the right and left of a vertical plane through its center, so the *CG* will lie on a plane passing vertically through the center of your model.

The center of lateral area or *CLA* may be found by finding the *CG* or point of balance of a cardboard silhouette of the side elevation of your model. Obviously, this silhouette *need not be full scale.* If it is 12" long it will be large enough. When this is cut out carefully, cement one extra thickness of cardboard over that part of the silhouette representing the wing elevation. If there are two wheels for the landing gear, double the thickness of cardboard there also.

Do the same with the fins if there are two fins; in other words, add an extra thickness of cardboard for every elevation that may be imposed behind another when looking at the side of the airplane. When your silhouette is complete, balance it on the point of a pin, searching out the point of balance until it remains steady in horizontal position. This point is the *CLA*. Sometimes this point is outside of the silhouette itself. In such case we suggest that you extend a finger of cardboard outward to encompass the point of balance and form a solid support for the pin. To find the forward *CLA* and the rearward *CLA*, cut the silhouette directly in half through the *CLA*, then find the point of balance of each half of the silhouette. The point of balance of the forward half will be the FCLA and of the rear half the RCLA.

We hope this information will answer the questions of R. W. Barkley, James W. Brown, Jr. and P. E. Markle. Other readers wishing further information on *CLA* and the rolling axis through these points should read November and December "Design Forum." Any questions concerning these or relative subjects will be gladly answered in future issues.

Don't forget to send in your latest designs for comment. Address all mail to "Design Forum," c/o Model Airplane News, 551-5th Ave., New York 17, N. Y.

PHOTO CREDITS

Page		
2	Upper	Harold G. Martin
	Lower	Official U.S. Navy Photo
9	Top	Ernie Petry
	Others	Messner
12	Top	Ernie Petry
19	All	Harold G. Martin

TAILLESS MODELS

The tailless configuration is always of interest, but most modelers stick to the customary swept-back wing design. However, the swept-forward layout offers many advantages; results of tests with this type and plans for a successful rubber model will be presented in

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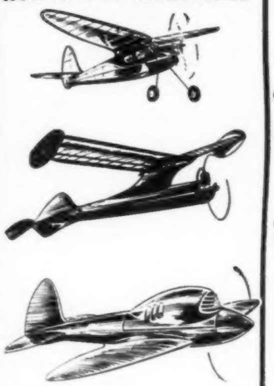

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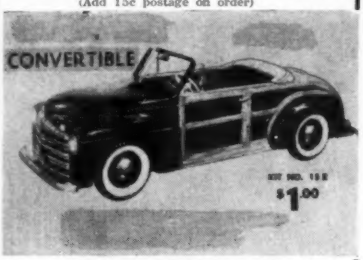

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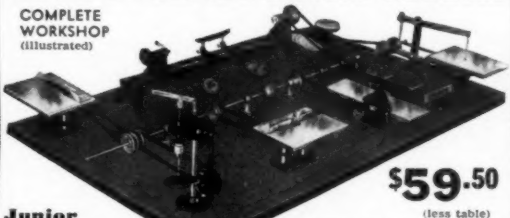

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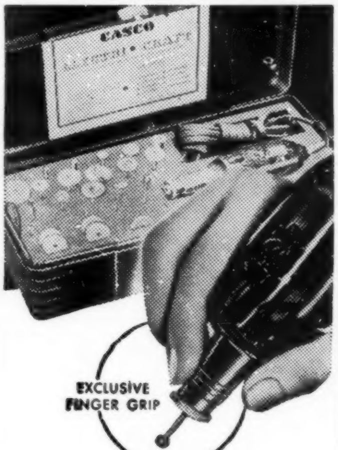

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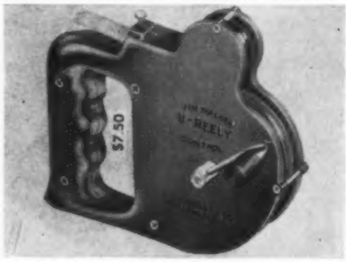

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